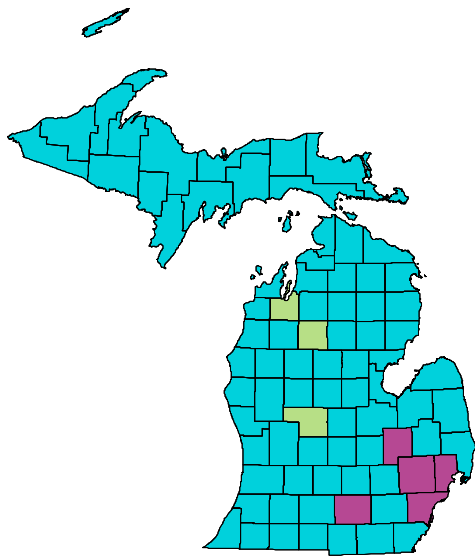


The Cancer Burden in Michigan: Selected Statistics [1985-2000]



Developed by the Michigan Public Health Institute (MPHI) in support of the
Michigan Cancer Consortium Initiative (MCCI).



Michigan Public
Health Institute



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Background

This report describes the cancer burden in Michigan in terms morbidity and mortality, and the human and financial cost associated with cancer to the extent to which data are available at this time. Five cancer sites are presented: breast, cervical, colorectal, lung and prostate. Throughout this report, breast cancer statistics refer to female breast cancer only.

Presented in this report are epidemiological analyses of cancer mortality from years 1985 to 2000 and incidence from 1985 to 1999 for the selected cancer sites.¹ Mortality data are from the Michigan Resident Death Files and incidence data are from the Michigan Resident Cancer Incidence File, which are both provided by the Michigan Department of Community Health, Division of Vital Records and Health Statistics.² Michigan rates are compared with national mortality and incidence rates from the SEER Cancer Statistics Review, which is produced by the National Cancer Institute.³ Unless otherwise specified, all incidence and mortality rates referred to in the text are age-adjusted according to the 2000 standard U.S. population.⁴

Also presented are data on the stage at diagnosis for cases reported in Michigan and relative survival rates for the selected cancer sites. Relative survival rates were obtained from the SEER Cancer Statistics Review.

Comparisons of incidence and mortality rates amongst Michigan counties and changes in the percentage of cases diagnosed at an early stage in counties are presented graphically on maps of Michigan.

1 Whenever possible, the data quoted in this report are the most recent available. Frequently, there is an 18- to 24-month interval between the time a cancer is diagnosed and the time that information is available from the Michigan Cancer Registry. However, cancer mortality data for any given year generally are available from the Registry within several months after the close of that calendar year. Hence, the cancer-related mortality data that are available often are more recent than the available cancer-related incidence data.

2 Michigan Resident Cancer Incidence File including cases processed by November 28, 2001 and Michigan Resident Death Files, Michigan Department of Community Health (MDCH), Division for Vital Records and Health Statistics.

3 Ries LAG, Eisner MP, Kosary CL, Hankey BF, Miller BA, Clegg L, Edwards BK (eds). SEER Cancer Statistics Review, 1973-1999, National Cancer Institute. Bethesda, MD, 2000. http://seer.cancer.gov/csr/1973_1999/, 2002. A continuing program of the National Cancer Institute (NCI), the SEER program collects data on a routine basis from designated population-based cancer registries in various areas of the country. Trends in cancer incidence, mortality and patient survival in the United States are derived from this database. SEER data are collected from nine or twelve geographic areas that represent, respectively, an estimated 10 or 14% of the US population. The long-term incidence trends and survival data for this report are from five states—Connecticut, Hawaii, Iowa, New Mexico, and Utah—and four metropolitan areas—Detroit, Atlanta, San Francisco-Oakland, and Seattle-Puget Sound. Additional tables provide more recent incidence rates and trends for SEER from twelve areas (the nine areas above plus Los Angeles, San Jose-Monterey, and the Alaska Native Registry) since 1992.

4 Michigan Department of Community Health (MDCH), Division for Vital Records and Health Statistics.

A summary of data on cancer-related behavioral risk factors is presented. Behavior data for Michigan residents were obtained from the Michigan Department of Community Health's Behavioral Risk Factor Survey System (BRFSS) and the Michigan State Board of Education's Michigan Youth Risk Behavior Survey (YRBS).⁵

Analyses of years of life lost due to the selected cancers are presented for Michigan and the United States. Data for the United States were taken from the SEER Cancer Statistics Review, and United States Life Tables for 1999 were used to calculate years of life lost in Michigan as well as nationally.⁶

Analyses of some of the financial costs of cancer are presented. Payment data are from Blue Cross Blue Shield of Michigan, Medicare Part A and Medicare Part B.⁷ Hospitalization data are from the statewide hospital discharge database at the Michigan Department of Community Health and from Blue Cross Blue Shield of Michigan.⁸

A graphic presentation of the distribution of mammography and radiation therapy facilities in Michigan is presented. Mammography and radiation therapy facility data were obtained from the Michigan Department of Consumer Industry Services, Radiation Safety Section, and ArcView GIS was used to analyze the proportion of the population within specified distances of mammography and radiation therapy facilities.⁹

In the appendices are incidence and mortality rates by county for the cancer sites and the proportion of cases localized at diagnosis for each of the cancer sites by county during two time periods.

5 Health Risk Behaviors 1995, Health Risk Behaviors 1996, Health Risk Behaviors 1999, Health Risk Behaviors 2000, Michigan Department of Community Health; 1999 Michigan Youth Risk Behavior Survey, Michigan State Board of Education.

6 United States Life Tables, 1999; National Vital Statistics Reports from the Centers for Disease Control and Prevention

7 Blue Cross Blue Shield of Michigan, Center for Healthcare Quality; Blue Care Network; Medicare Part A and Medicare Part B from Michigan Peer Review Organization and Wisconsin Physician Service, Medicare Central Data Unit.

8 Michigan Resident Hospitalizations Files, Michigan Department of Community Health (MDCH), Division for Vital Records and Health Statistics.

9 Mammography Facility Status in Michigan, October 23, 2002 and Therapy Accelerator Facilities in Michigan, October 23, 2002, Michigan Department of Consumer Industry Services, Radiation Safety Section.

Selected Cancer Sites:

All, Breast, Cervical, Colorectal, Lung, and Prostate

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Selected Cancer Sites: All, Breast, Cervical, Colorectal, Lung, and Prostate

This section of the report presents the findings of epidemiological analyses of cancer mortality and incidence for the five selected cancer sites: breast, cervical, colorectal, lung, and prostate. Population data on deaths due to cancer from 1991 to 2000 and new cancer cases from 1987 to 1999 were made available from the statewide cancer registry at the Michigan Department of Community Health.¹

Michigan Mortality and Incidence

Age-adjusted mortality rates in 2000 and incidence rates in 1999 are presented for the selected cancers. These were calculated by the direct age-adjustment method, using the 2000 U.S. population age distribution as the standard population, to allow comparisons across population subgroups.² Annual state population estimates based on the actual size of the Michigan population in 1999 were used to calculate rates.³

Comparisons of age-adjusted mortality and incidence rates between gender and racial groups are presented, as are age-specific rates. Michigan mortality and incidence rates for the selected cancer sites are compared to the corresponding national rates. National data were obtained from the National Cancer Institute's SEER program.⁴

Data on stage at diagnosis of the cancer cases reported in 1999 are presented. The proportions of cases diagnosed at different stages are compared between gender and racial groups to highlight disparities where they exist.

1 Michigan Resident Cancer Incidence File including cases processed by November 28, 2001, and Michigan Resident Death Files, Michigan Department of Community Health (MDCH), Division for Vital Records and Health Statistics.

2 Michigan Department of Community Health (MDCH), Division for Vital Records and Health Statistics.

3 Population data provided by the Michigan Department of Management and Budget, received December 19, 2000. At the time these analyses were conducted, population estimates for year 2000 were not yet available; thus, estimates for 1999 were used in place of year 2000 estimates.

4 Ries LAG, Eisner MP, Kosary CL, Hankey BF, Miller BA, Clegg L, Edwards BK (eds). SEER Cancer Statistics Review, 1973-1999, National Cancer Institute. Bethesda, MD, 2000. http://seer.cancer.gov/csr/1973_1999/, 2002. A continuing program of the National Cancer Institute (NCI), the SEER program collects data on a routine basis from designated population-based cancer registries in various areas of the country. Trends in cancer incidence, mortality and patient survival in the United States are derived from this database. SEER data are collected from nine or twelve geographic areas that represent, respectively, an estimated 10 or 14% of the US population. The long-term incidence trends and survival data for this report are from five states—Connecticut, Hawaii, Iowa, New Mexico, and Utah—and four metropolitan areas—Detroit, Atlanta, San Francisco-Oakland, and Seattle-Puget Sound. Additional tables provide more recent incidence rates and trends for SEER from twelve areas (the nine areas above plus Los Angeles, San Jose-Monterey, and the Alaska Native Registry) since 1992.

Michigan-specific data on rates of survival from the selected cancers are not available at this time. National data from the National Cancer Institute's SEER program on relative survival rates are presented. The relative survival rate represents the likelihood that a patient will survive their cancer for some specified time (usually five years) after their initial cancer diagnosis.⁵

County Mortality and Incidence

Ten-year age-adjusted incidence and mortality rates are presented for the selected cancers for each county. Rates were calculated by the direct age-adjustment method using the 2000 US population age distribution, and annual state population estimates based on actual size of the county populations for years 1990 to 1999 and 1991 to 1999 were used in calculating ten-year incidence and mortality rates, respectively.⁶ Z tests were used to compare rates among counties, identifying counties with significantly higher or lower rates than all other counties combined. In conducting the Z tests, the age-adjusted rate for all counties combined was calculated including only deaths in the state for which the county was known. Differences in age-adjusted incidence and mortality rates were tested at 95% confidence levels.

Stage at Diagnosis, by Site and by County

The percentage of cancer cases diagnosed at the localized and/or in-situ stage is presented by cancer site for each county for time periods 1987 to 1989 and 1997 to 1999 to highlight where changes in percentage of cases diagnosed at a localized and/or in-situ stage have occurred. The percentage of cases localized at diagnosis is calculated out of all invasive cancers of the specific sites; the percentage of cases in-situ at diagnosis is calculated out of all invasive and in-situ cancers of the specific sites. To illustrate changes in stage at diagnosis, counties were ranked according to the percentage of cases that were diagnosed while the cancer was still localized and/or in-situ in the first three-year period. Counties were divided into quartiles for these ranked percentages. The same percentage ranges were used to classify counties during the second three-year period so that changes could be observed visually by comparing maps for each period.

Conclusions from this analysis by county must take into consideration the various factors contributing to changes in stage at diagnosis at the county level. One factor to consider is the limitation of the low number of cases in some counties. Several counties had fewer than 20 reported cancer cases for at least one of the time periods and cancer sites. Therefore, a decrease in the percentage of cases localized at diagnosis could mean a relatively small change in the number of cases at each stage. Also, it is important to note that changes in reporting and staging practices could have changed over time within a county. Usually increases in the percentage of cases localized or in-situ at diagnosis are associated with an increase in screening but an apparent decline in the percentage localized or in-situ does not necessarily reflect changes in

⁵ Relative survival rates for cases diagnosed 1992-1998.

⁶ Population data provided by the Michigan Department of Management and Budget, received December 19, 2000.

prevention practices or quality of care. Yet, as an illustration of changing trends in stage at diagnosis, comparing the maps for each time period reveals where broad changes have occurred in the state as a whole.

Summary

Analyses of deaths due to cancer and new cancer cases at all sites combined are shown in Tables 1 and 2. Most cancer cases and deaths occur in the population aged 55 years and older.

Following the tables showing statistics for all cancer sites combined are tables showing statistics for five sites: breast cancer (Tables 3 through 9), cervical cancer (Tables 10 through 16), colorectal cancer (Tables 17 through 23), lung cancer (Tables 24 through 30), and prostate cancer (Tables 31 through 37).

Cancer mortality and incidence rates are higher in the older age groups for breast, colorectal, lung and prostate cancer. Cervical cancer mortality rates also increase with age, but incidence rates peak among middle-aged women (40-49).

Mortality rates for each of the sites are higher among blacks than among whites. Although breast cancer incidence rates are higher in white women, breast cancer mortality rates are higher in black women (black to white rate ratio of 0.9 for incidence and 1.3 for mortality). For the other four cancer sites, incidence rates, like mortality rates, are higher among blacks than whites. The largest ratio of mortality rates was the ratio of black to white prostate cancer mortality rates; this was 1.9. The ratio for black to white prostate cancer incidence rates was 1.6. Black to white mortality rate and incidence rate ratios for cervical cancer were 1.5 and 1.8 respectively. Colorectal cancer rate ratios for black to white mortality and incidence were 1.6 and 1.2 respectively, and lung cancer ratios for mortality and incidence rates were 1.2 and 1.3 respectively.

Five-year survival rates for each of the five cancer sites reveals a disparity in survival between blacks and whites. For breast, cervical and colorectal cancer, blacks have a lower survival rate than whites even when cancers are detected at the same stage. The five-year survival rates for lung cancer detected at a localized or regional stage are lower for blacks than whites. When prostate cancer is detected at a localized or regional stage, the five-year survival rates are 100% for both blacks and whites, but as cancers are detected at a later stage, the five-year survival rate among blacks becomes lower than the rate among whites. Compounding this survival disparity between races is the fact that in 1999, breast, cervical, colorectal and lung cancer cases were diagnosed early with less frequency among blacks compared to whites.

Significant differences in incidence and mortality rates among counties for each of the five sites over a ten-year period are shown in Figures 1, 2, 5, 6, 8, 9, 11, 12, 14 and 15.

In Figures 3, 4, 7, 10, 13, and 16, maps of the percentage of cases diagnosed when the cancer was still localized and/or in-situ illustrate that diagnosis of breast cancer while localized or in-situ improved most dramatically of the five cancer sites in Michigan (changes in the state as a whole are listed in Tables 3, 4, 5, 6, 7 and 8 in the Appendix to this report.). This apparent change was consistent with the change in stage at breast cancer diagnosis in Michigan overall during this time period from 49.6% localized to 61.0% and from 9.7% in-situ to 18.8%. Prostate cancer detection also showed a clear shift towards a greater proportion of cancers detected while localized, and statewide the percentage of cases detected while localized changed from 54.3% to 71.0%. Detection of cervical cancer while in-situ showed modest improvement (from 77.2% to 85.3% in the state overall). Colorectal and lung cancer detection while cancer was localized did not noticeably change (statewide the percentage of cases detected while the cancer was localized went from 31.6% to 35.7% and 19.9% to 19.8%, respectively). Observed differences in the percentage of cancers diagnosed while localized or in-situ may possibly be due to changes in early detection, changes in coding or pathology review and reporting, changes in record keeping, or the introduction of new medical practitioners or facilities.

Table 1.

Number of Cancer Deaths and New Cancer Cases
by *Age Group* and *Gender*, All Sites,
Michigan Residents

		All Ages	Under 35	35-54	55-74	75 and Over
Deaths, 2000	Males	10,193	116	1,141	4,754	4,182
	Females	9,571	128	1,232	4,009	4,202
	Total	19,764	244	2,373	8,763	8,384
New Cases, 1999	Males	25,011	665	3,613	13,554	7,176
	Females	22,667	916	5,047	9,812	6,886
	Total	47,683	1,581	8,661	23,368	14,064

Table 2.

Cancer Mortality and Incidence Rates
by ***Gender*** and ***Race***, All Sites,
Michigan Residents

		Rate per 100,000*		Ratio
		Blacks	Whites	Blacks/Whites
2000 Mortality	Total	248.0	199.7	1.2
	Males	312.9	255.4	1.2
	Females	206.2	166.7	1.2
1999 Incidence	Total	536.5	478.9	1.1
	Males	716.9	578.8	1.2
	Females	416.9	415.8	1.0

*Rates are age-adjusted and computed by race and gender.

Table 3.

Number of Breast Cancer Deaths and
New Breast Cancer Cases by *Age Group*,
Michigan Residents

	All Ages	Under 35	35-54	55-74	75 and Over
Deaths, 2000	1,494	18	341	584	551
New Cases, 1999	6,795	111	2,101	2,977	1,606

Table 4.

Breast Cancer Mortality Rates, Michigan 2000 vs. SEER 1999

	Number in Michigan	Age-Adjusted Rate*	
		Michigan (2000)	SEER (1999)
Total	1,494	27.2	27.0
Whites	1,257	26.1	26.3
Blacks	222	34.8	35.8

*Rate per 100,000 race- and gender-specific population.

Table 5.

Breast Cancer Incidence Rates, Michigan 1999 vs. SEER 1999

	Number in Michigan	Age-Adjusted Rate*	
		Michigan (1999)	SEER (1999)
Total	6,795	128.1	139.1
Whites	5,884	128.8	143.0
Blacks	760	117.7	123.9

*Rate per 100,000 age- and gender-specific population.

Table 6.

Age-specific Breast Cancer Mortality Rates,
Michigan Residents, 2000

	Number	Rate*
25-39 Years	54	4.8
40-49 Years	172	22.2
50-64 Years	399	54.2
65 Years and Over	869	119.0

*Rate per 100,000 age- and gender-specific population.

Table 7.

Age-specific Breast Cancer Incidence Rates,
Michigan Residents, 1999

	Number	Rate*
25-39 Years	318	28.3
40-49 Years	1,150	148.2
50-64 Years	2,191	297.8
65 Years and Over	3,127	428.0

*Rate per 100,000 age- and gender-specific population.

Table 8.

Breast Cancer Five-Year Relative Survival Rates by Stage and Race (SEER)

	Total %	White %	Black %
All stages	86.2	87.6	72.5
Localized	96.8	97.4	88.9
Regional	78.4	80.2	65.4
Distant	22.5	24.0	14.7
Unknown	55.2	55.5	51.0

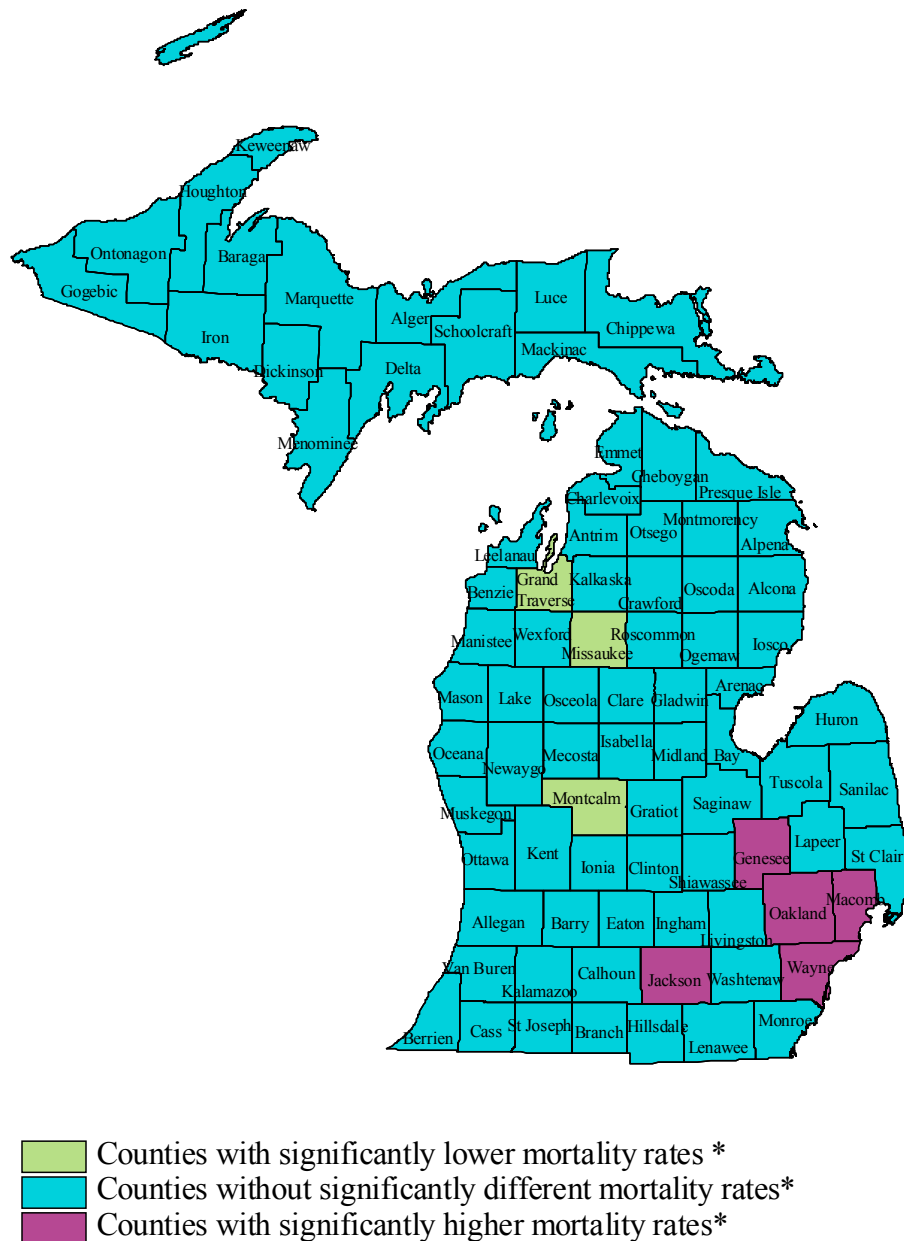
Table 9.

Numbers and Percentages of Invasive Breast Cancer (Primary Site) by Stage at Diagnosis and Race, Michigan Residents, 1999

	Total Number	Stage at Diagnosis							
		Localized		Regional		Distant		Unknown	
		Number	%	Number	%	Number	%	Number	%
Total	6,795	4,175	61.4	1,817	26.7	259	3.8	544	8.0
Blacks	760	409	53.8	264	34.7	45	5.9	42	5.5
Whites	5,884	3,688	62.7	1,517	25.8	204	3.5	475	8.1

Figure 1.

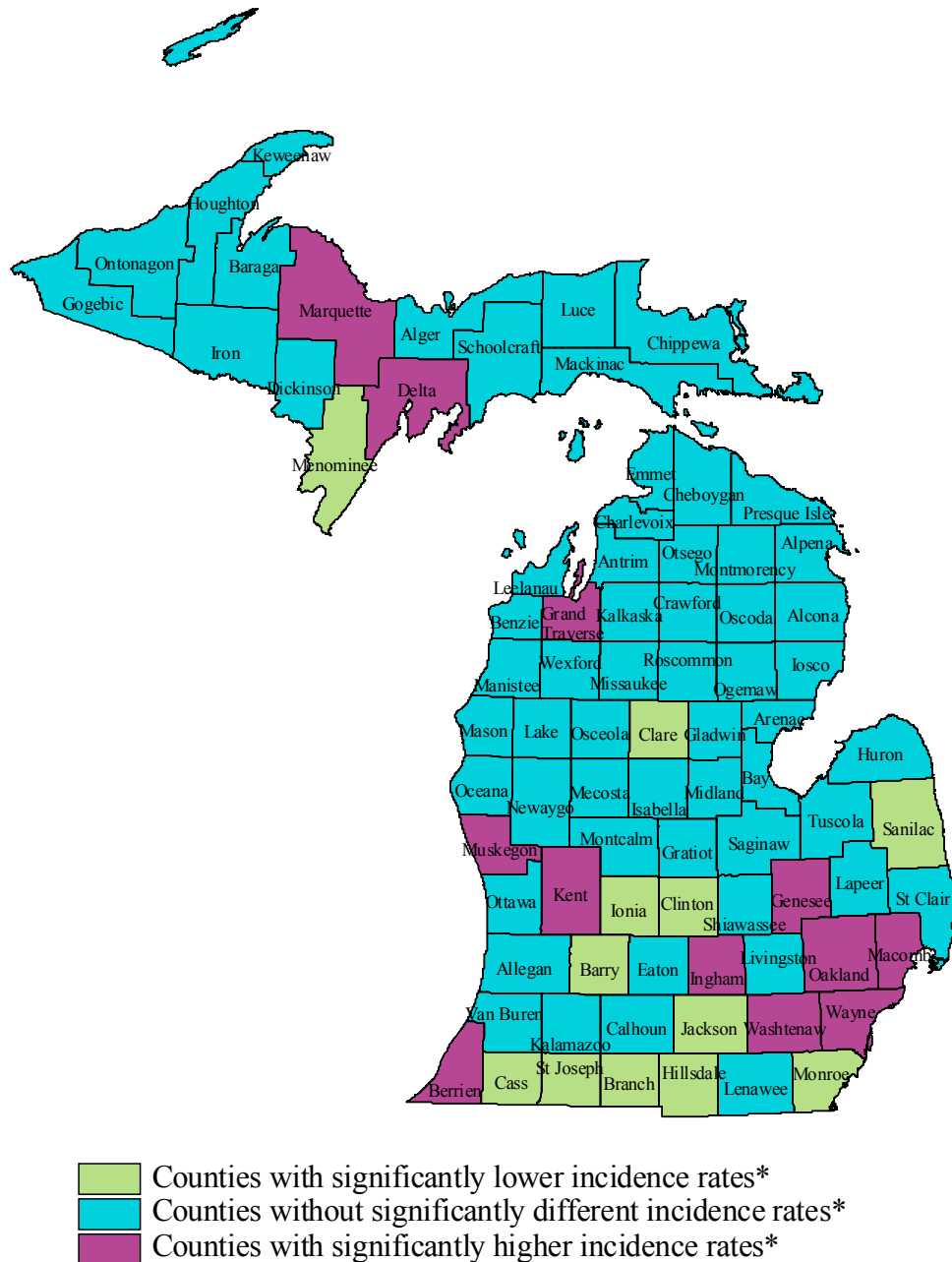
Breast Cancer Mortality Rates by County, 1991-2000



* Differences in age-adjusted mortality rates were statistically tested at 95% confidence levels to compare each county with all other counties combined.

Figure 2.

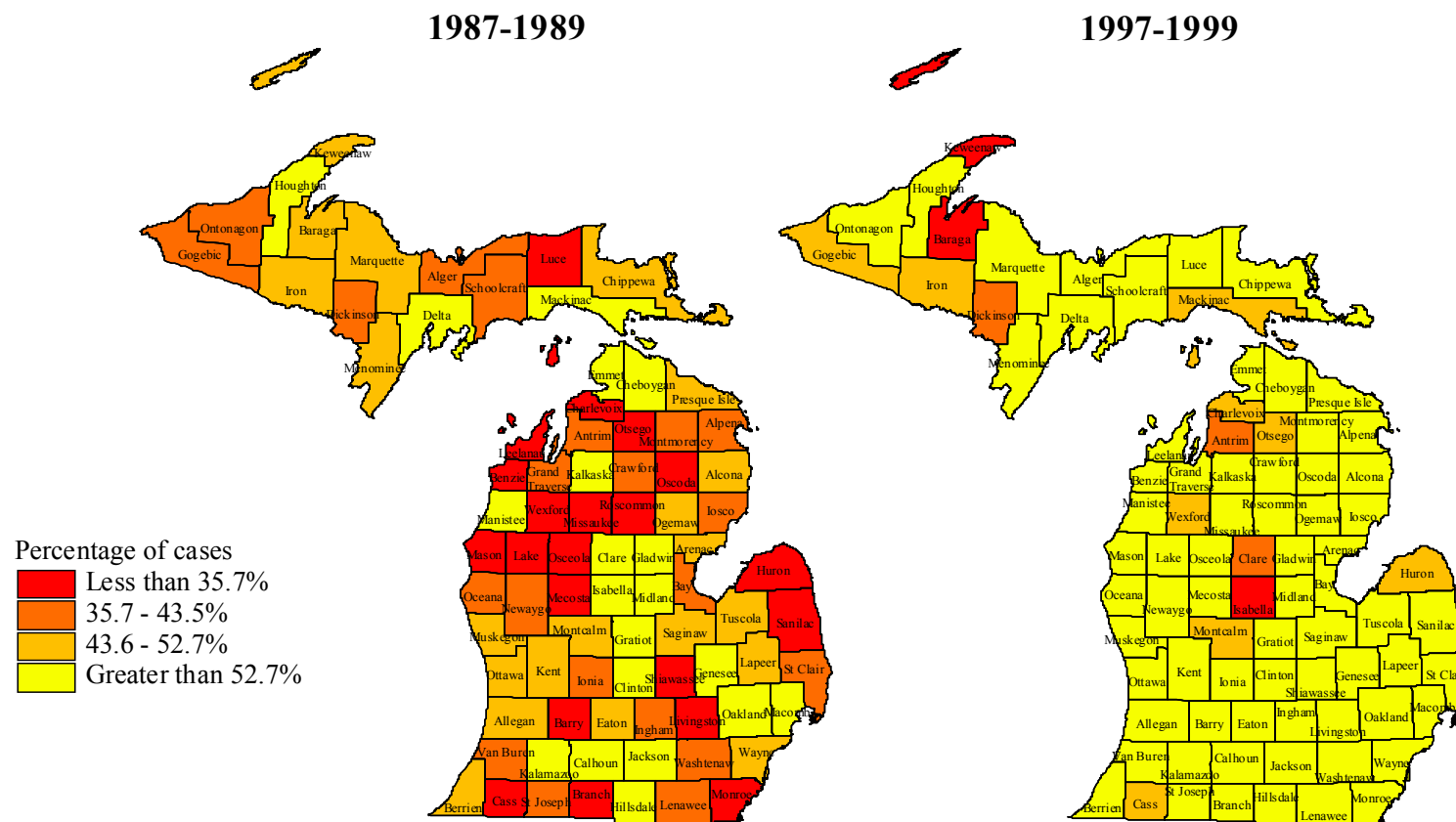
Breast Cancer Incidence Rates by County, 1990-1999



* Differences in age-adjusted incidence rates were statistically tested at 95% confidence levels to compare each county with all other counties combined.

Figure 3.

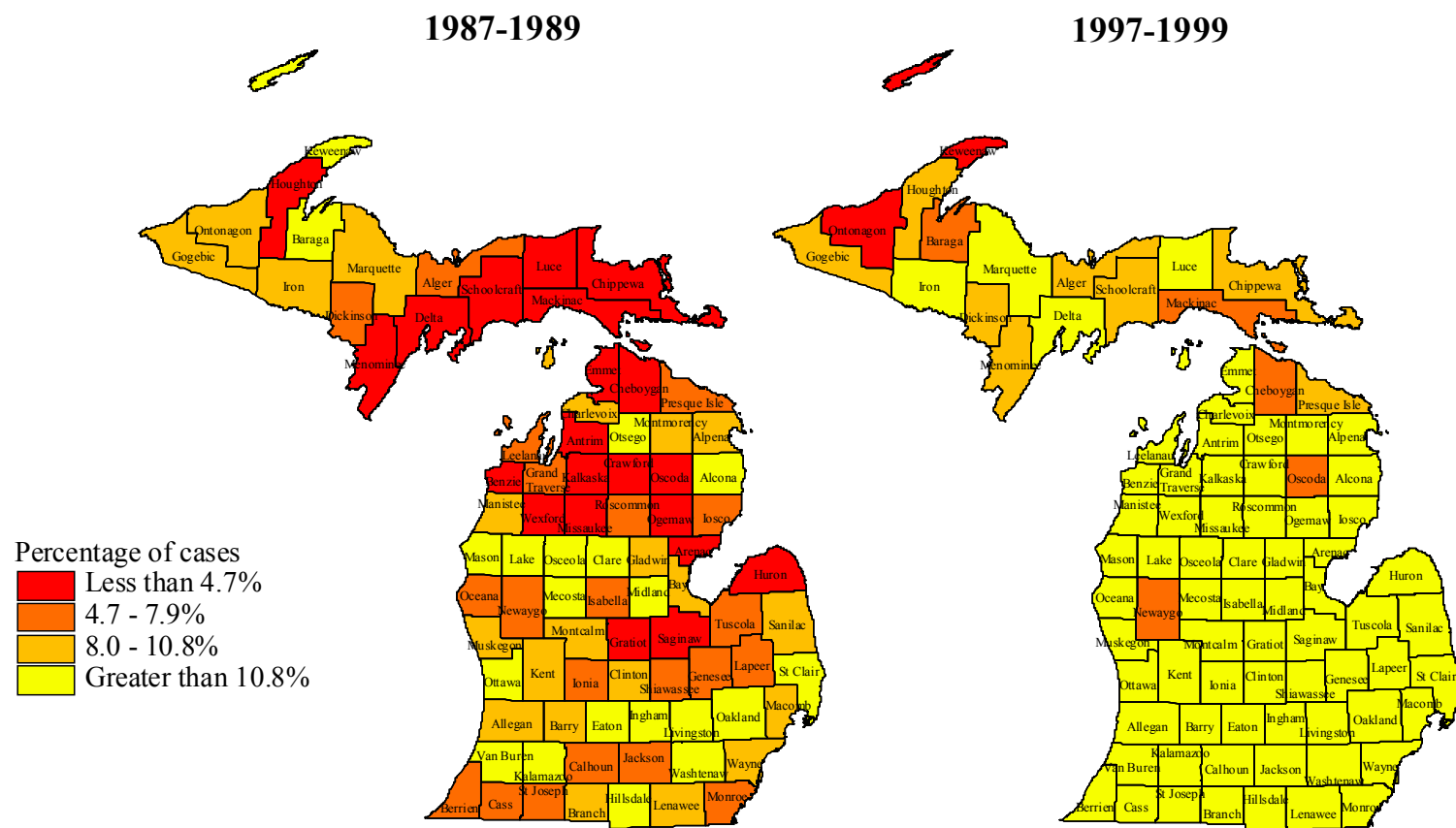
Percentage of Breast Cancer Cases Localized at Diagnosis by County



An MCC priority objective for breast cancer is that by the year 2003, 80% of women will have received age-appropriate annual breast cancer screening with clinical breast examinations and mammography.

Figure 4.

Percentage of Breast Cancer Cases In-situ at Diagnosis by County



An MCC priority objective for breast cancer is that by the year 2003, 80% of women will have received age-appropriate annual breast cancer screening with clinical breast examinations and mammography.

Table 10.

Number of Cervical Cancer Deaths and
New Cervical Cancer Cases by *Age Group*,
Michigan Residents

	All Ages	Under 35	35-54	55-74	75 and Over
Deaths, 2000	130	4	49	47	30
New Cases, 1999	422	78	193	104	46

Table 11.

Cervical Cancer Mortality Rates, Michigan 2000 vs. SEER 1999

	Number in Michigan	Age-Adjusted Rate*	
		Michigan (2000)	SEER (1999)
Total	130	2.5	2.9
Whites	103	2.3	2.6
Blacks	23	3.5	5.5

*Rate per 100,000 age- and gender-specific population.

Table 12.

Cervical Cancer Incidence Rates, Michigan 1999 vs. SEER 1999

	Number in Michigan	Age-Adjusted Rate*	
		Michigan (1999)	SEER (1999)
Total	422	8.1	8.0
Whites	316	7.3	7.4
Blacks	88	13.2	13.3

*Rate per 100,000 age- and gender-specific population.

Table 13.

**Age-specific Cervical Cancer Mortality Rates,
Michigan Residents, 2000**

	Number	Rate*
25-39 Years	13	1.2
40-49 Years	23	3.0
50-64 Years	39	5.3
65 Years and Over	55	7.5

*Rate per 100,000 age- and gender-specific population.

Table 14.

**Age-specific Cervical Cancer Incidence Rates,
Michigan Residents, 1999**

	Number	Rate*
25-39 Years	117	10.4
40-49 Years	110	14.2
50-64 Years	89	12.1
65 Years and Over	95	13.0

*Rate per 100,000 age- and gender-specific population.

Table 15.

Cervical Cancer Five-Year Relative Survival Rates by Stage and Race (SEER)

	Total %	White %	Black %
All stages	70.7	72.1	59.9
Localized	92.2	92.6	87.1
Regional	50.6	51.3	41.0
Distant	15.2	16.5	7.5
Unknown	52.0	53.3	49.8

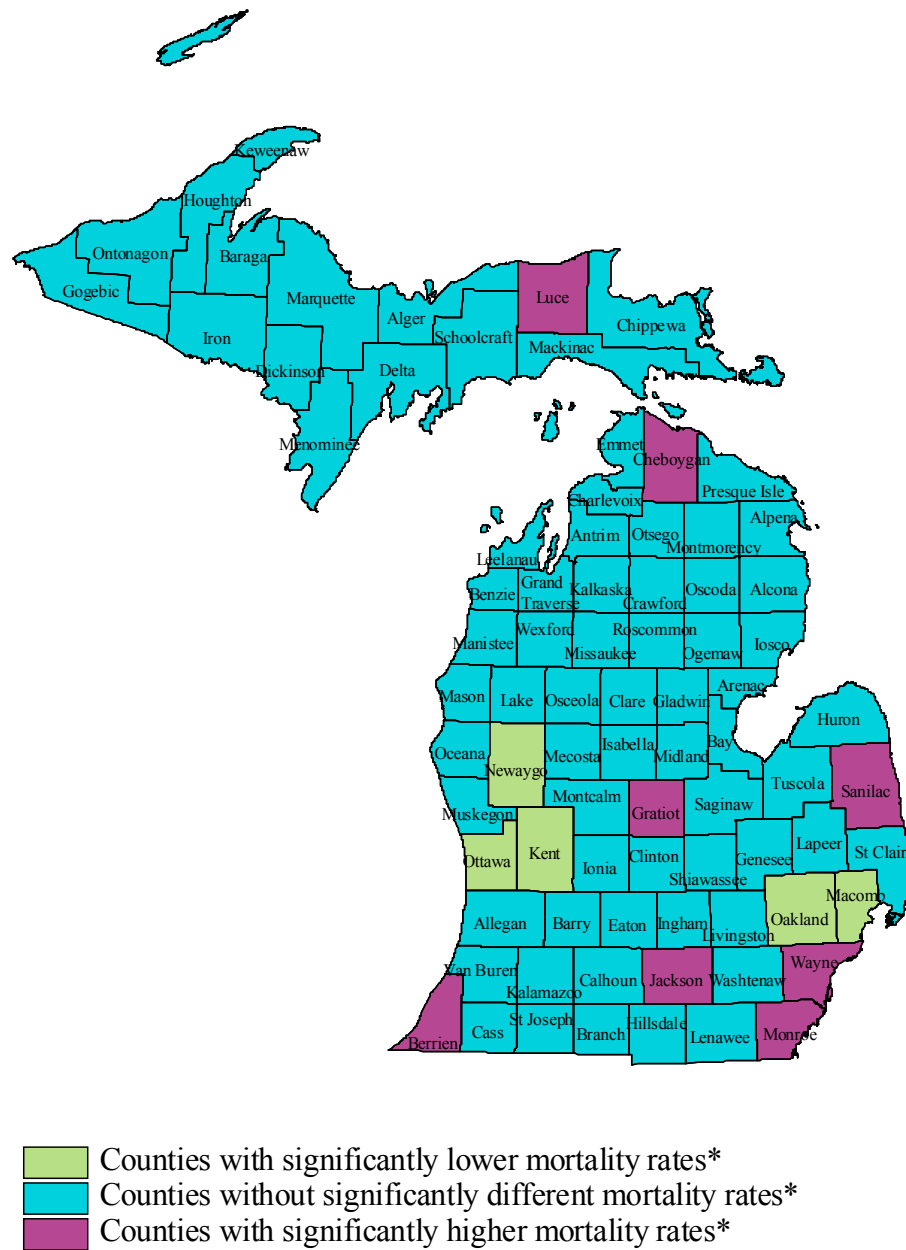
Table 16.

Numbers and Percentages of Invasive Cervical Cancer (Primary Site) by Stage at Diagnosis and Race, Michigan Residents, 1999

		Stage at Diagnosis							
	Total Number	Localized		Regional		Distant		Unknown	
		Number	%	Number	%	Number	%	Number	%
Total	422	231	54.7	95	22.5	26	6.2	70	16.6
Blacks	88	42	47.7	22	25.0	5	5.7	19	21.6
Whites	316	181	57.3	70	22.2	20	6.3	45	14.2

Figure 5.

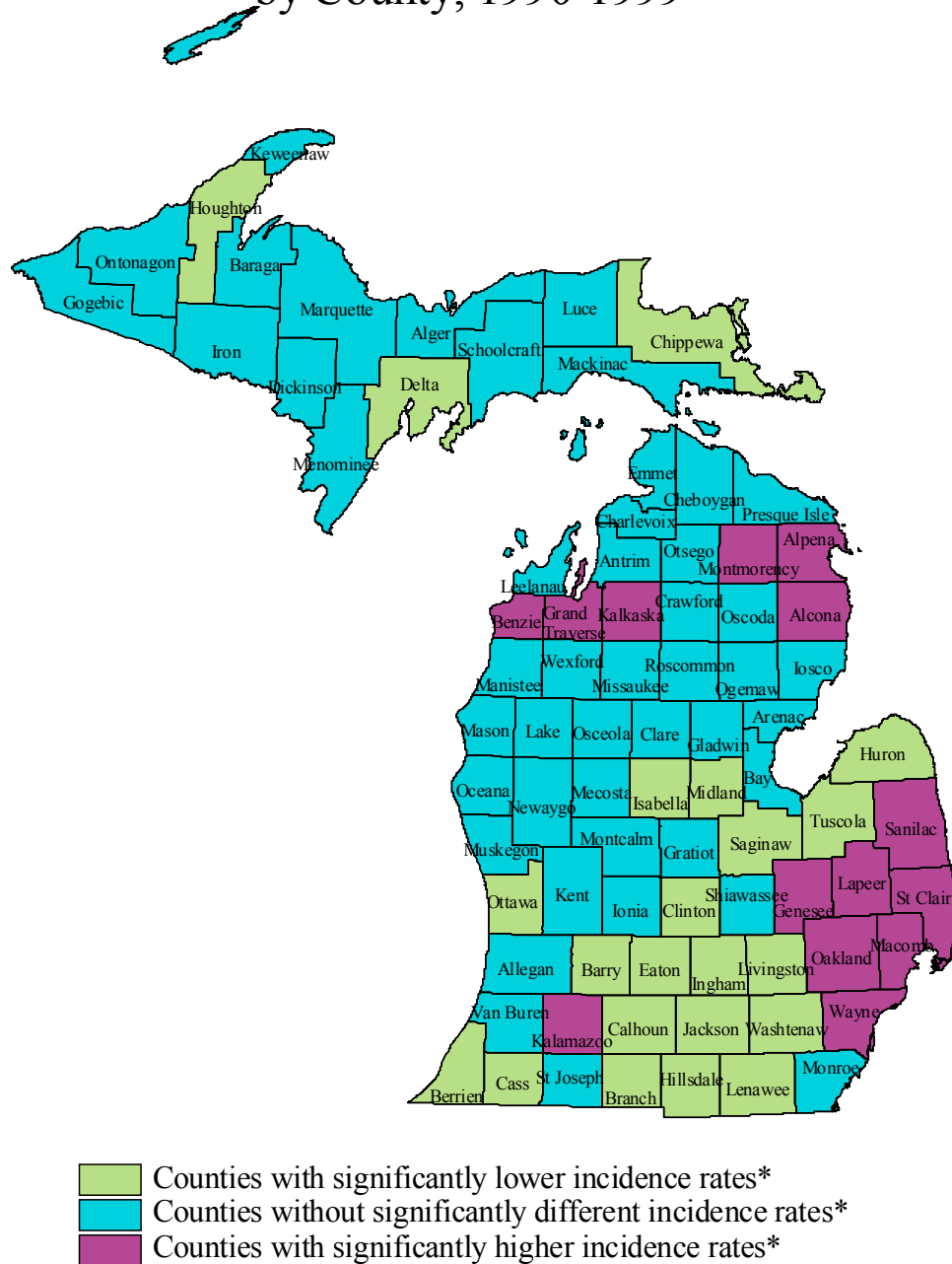
Cervical Cancer Mortality Rates by County, 1991-2000



* Differences in age-adjusted mortality rates were statistically tested at 95% confidence levels to compare each county with all other counties combined.

Figure 6.

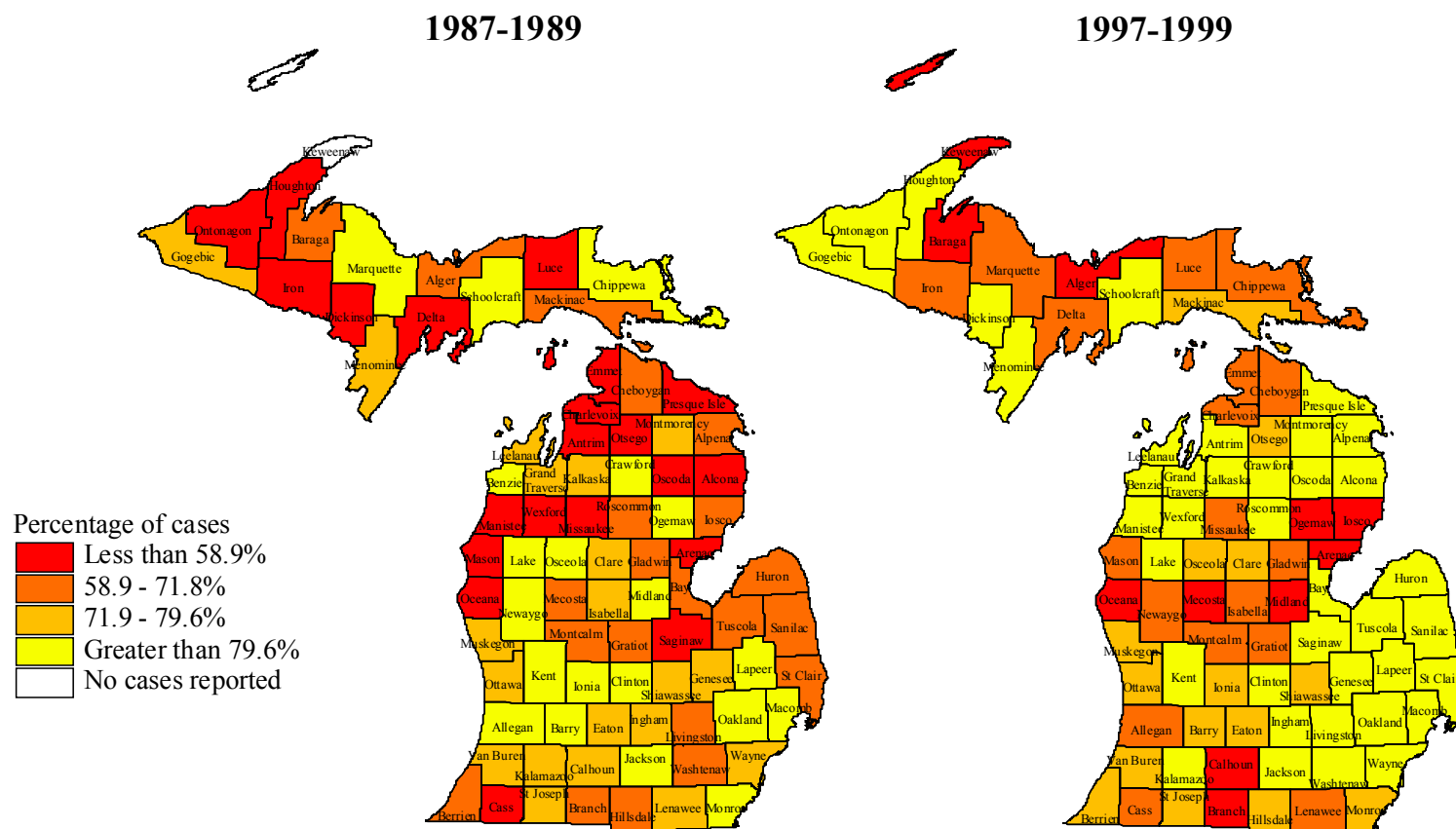
In-situ or Invasive Cervical Cancer Incidence Rates by County, 1990-1999



* Differences in age-adjusted incidence rates were statistically tested at 95% confidence levels to compare each county with all other counties combined.

Figure 7.

Percentage of Cervical Cancer Cases In-situ at Diagnosis by County



An MCC priority objective for cervical cancer is that by the year 2005, 90% of women in high-risk populations will have received Pap smears according to evidence-based guidelines.

Table 17.

Number of Colorectal Cancer Deaths and
New Colorectal Cancer Cases
by *Age Group* and *Gender*,
Michigan Residents

		All Ages	Under 35	35-54	55-74	75 and Over
Deaths, 2000	Males	979	4	96	421	458
	Females	979	3	107	319	550
	Total	1,958	7	203	740	1,008
New Cases, 1999	Males	2,576	12	353	1,310	900
	Females	2,619	29	291	1,084	1,215
	Total	5,198	41	644	2,395	2,117

Table 18.

Colorectal Cancer Mortality Rates by ***Gender***, Michigan 2000 vs. SEER 1999

	Number in Michigan	Age-Adjusted Rate*	
		Michigan (2000)	SEER (1999)
Total	1,958	20.4	21.1
Males	979	25.9	25.4
White Males	824	24.7	25.0
Black Males	143	35.6	34.0
Females	979	17.0	18.0
White Females	811	15.9	17.4
Black Females	159	25.8	25.3

*Rate per 100,000 race- and gender-specific population.

Table 19.

Colorectal Cancer Incidence Rates by ***Gender***, Michigan 1999 vs. SEER 1999

	Number in Michigan	Age-Adjusted Rate*	
		Michigan (1999)	SEER (1999)
Total	5,198	53.8	54.3
Males	2,576	63.9	63.7
White Males	2,220	62.4	63.6
Black Males	310	73.3	67.1
Females	2,619	46.6	47.1
White Females	2,230	45.0	46.2
Black Females	340	53.8	58.0

*Rate per 100,000 race- and gender-specific population.

Table 20.

Age-specific Colorectal Cancer Mortality Rates by Gender, Michigan Residents, 2000

	Total		Males		Females	
	Number	Rate*	Number	Rate*	Number	Rate*
25-39 Years	31	1.4	19	1.7	12	1.1
40-49 Years	89	5.8	38	5.1	51	6.6
50-64 Years	338	23.6	190	27.2	148	20.1
65 Years and Over	1,500	122.6	732	148.4	768	105.1

*Rate per 100,000 age- and gender-specific population.

Table 21.

Age-specific Colorectal Cancer Incidence Rates by Gender, Michigan Residents, 1999

	Total		Males		Females	
	Number	Rate*	Number	Rate*	Number	Rate*
25-39 Years	111	5.0	53	4.8	58	5.2
40-49 Years	292	19.1	145	19.3	147	18.9
50-64 Years	1,159	80.8	666	95.2	493	67.0
65 Years and Over	3,628	296.5	1,710	346.7	1,915	262.1

*Rate per 100,000 age- and gender-specific population.

Table 22.

Colorectal Cancer Five-Year Relative Survival Rates by Stage, Gender and Race (SEER)

	Total %	Females		Males	
		White %	Black %	White %	Black %
All stages	61.9	62.7	52.8	62.6	52.7
Localized	90.1	90.5	84.8	90.9	83.4
Regional	65.2	66.7	56.7	65.2	58.4
Distant	8.8	9.1	8.8	8.8	5.9
Unknown	36.2	31.5	31.3	41.6	40.5

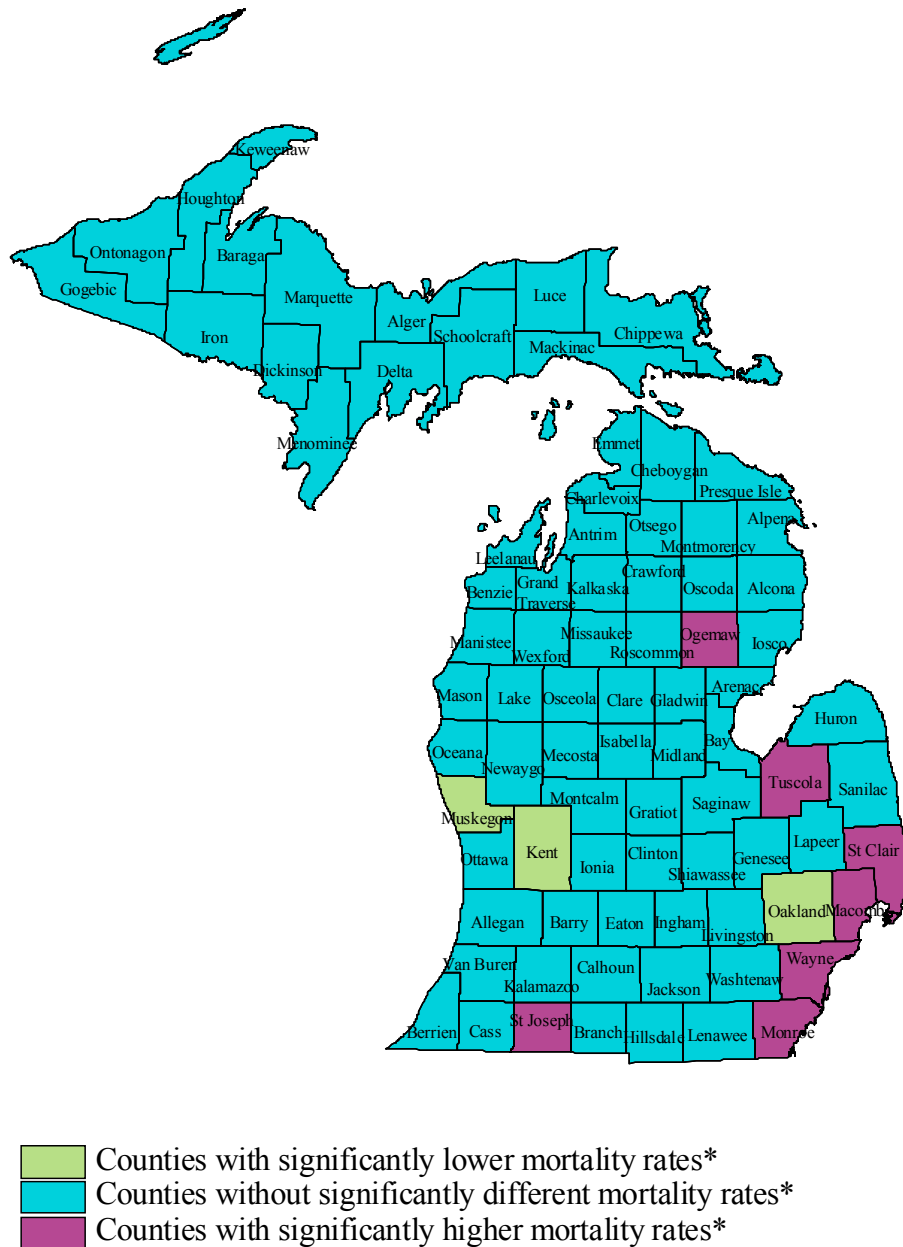
Table 23.

Numbers and Percentages of Invasive Colorectal Cancer (Primary Site) by Stage at Diagnosis and Race, Michigan Residents, 1999

	Total Number	Stage at Diagnosis							
		Localized		Regional		Distant		Unknown	
		Number	%	Number	%	Number	%	Number	%
Total	5,198	1,946	37.4	1,887	36.3	779	15.0	586	11.3
Blacks	650	225	34.6	226	34.8	135	20.8	64	9.8
Whites	4,453	1,685	37.8	1,626	36.5	635	14.3	507	11.4

Figure 8.

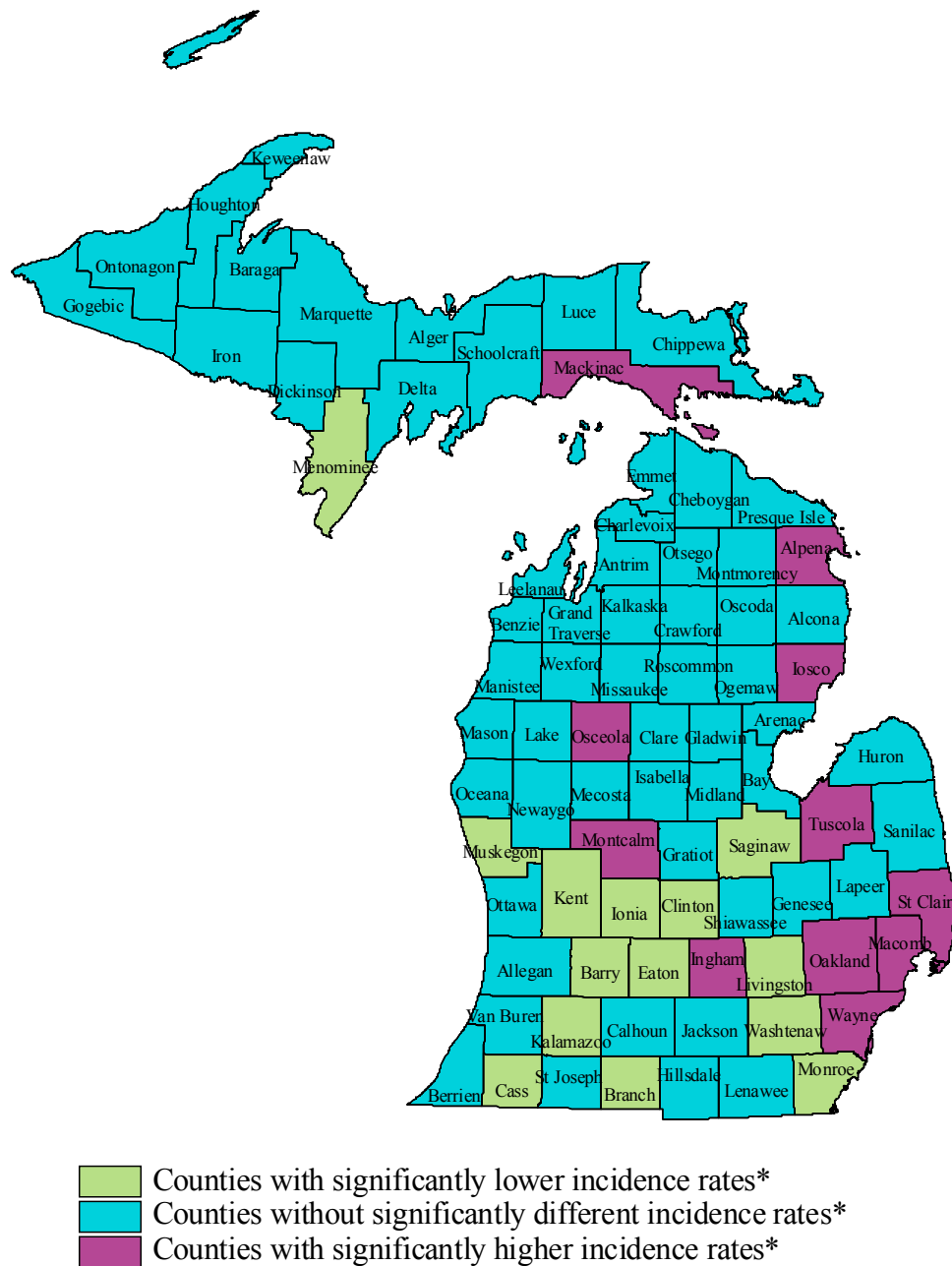
Colorectal Cancer Mortality Rates by County, 1991-2000



* Differences in age-adjusted mortality rates were statistically tested at 95% confidence levels to compare each county with all other counties combined.

Figure 9.

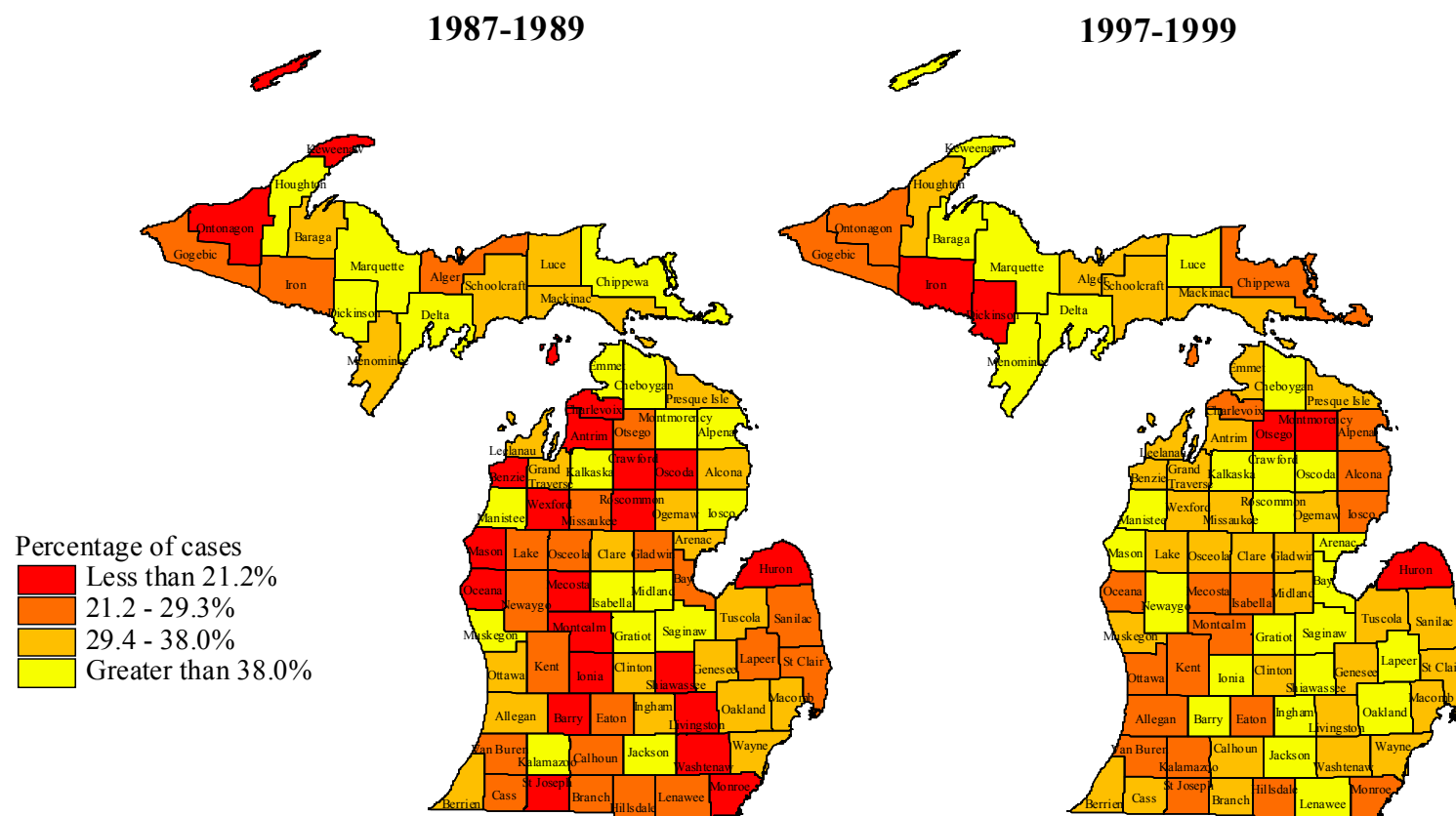
Colorectal Cancer Incidence Rates by County, 1990-1999



* Differences in age-adjusted incidence rates were statistically tested at 95% confidence levels to compare each county with all other counties combined.

Figure 10.

Percentage of Colorectal Cancer Cases Localized at Diagnosis by County



An MCC priority objective for colorectal cancer is that by the year 2004, 50% of average-risk people will have received appropriate colorectal cancer screening.

Table 24.

Number of Lung Cancer Deaths and
New Lung Cancer Cases
by *Age Group* and *Gender*,
Michigan Residents

		All Ages	Under 35	35-54	55-74	75 and Over
Deaths, 2000	Males	3,165	3	296	1,771	1,095
	Females	2,369	7	264	1,233	865
	Total	5,534	10	560	3,004	1,960
New Cases, 1999	Males	3,866	8	426	2,276	1,156
	Females	3,015	5	394	1,709	907
	Total	6,882	13	820	3,986	2,063

Table 25.

Lung Cancer Mortality Rates by *Gender*, Michigan 2000 vs. SEER 1999

	Number in Michigan	Age-Adjusted Rate*	
		Michigan (2000)	SEER (1999)
Total	5,534	57.3	56.0
Males	3,165	78.3	77.2
White Males	2,743	76.9	75.9
Black Males	396	92.5	102.7
Females	2,369	43.1	40.7
White Females	2,043	42.5	41.4
Black Females	301	48.1	40.6

*Rate per 100,000 race- and gender-specific population.

Table 26.

Lung Cancer Incidence Rates by *Gender*, Michigan 1999 vs. SEER 1999

	Number in Michigan	Age-Adjusted Rate*	
		Michigan (1999)	SEER (1999)
Total	6,882	71.2	63.5
Males	3,866	94.0	81.1
White Males	3,259	89.9	79.4
Black Males	563	129.0	115.0
Females	3,015	55.6	50.7
White Females	2,581	54.6	52.3
Black Females	403	64.6	57.0

*Rate per 100,000 race- and gender-specific population.

Table 27.

Age-specific Lung Cancer Mortality Rates by Gender, Michigan Residents, 2000

	Total		Males		Females	
	Number	Rate*	Number	Rate*	Number	Rate*
25-39 Years	38	1.7	18	1.6	20	1.8
40-49 Years	248	16.3	116	15.5	132	17.0
50-64 Years	1,364	95.0	805	115.1	559	76.0
65 Years and Over	3,881	317.2	2,223	450.8	1,658	227.0

*Rate per 100,000 age- and gender-specific population.

Table 28.

Age-specific Lung Cancer Incidence Rates by Gender, Michigan Residents, 1999

	Total		Males		Females	
	Number	Rate*	Number	Rate*	Number	Rate*
25-39 Years	56	2.5	23	2.1	33	2.9
40-49 Years	382	25.0	197	26.3	185	23.8
50-64 Years	1,875	130.6	1,041	148.8	833	113.2
65 Years and Over	4,569	373.4	2,605	528.2	1,964	268.8

*Rate per 100,000 age- and gender-specific population.

Table 29.

Lung Cancer Five-Year Relative Survival Rates by Stage, Gender and Race (SEER)

	Total %	Females		Males	
		White %	Black %	White %	Black %
All stages	14.7	17.0	14.7	13.3	10.8
Localized	48.5	53.3	49.1	45.2	38.4
Regional	21.7	24.0	20.6	20.7	16.5
Distant	2.5	2.8	3.6	2.1	2.3
Unknown	8.4	9.6	8.9	7.5	9.0

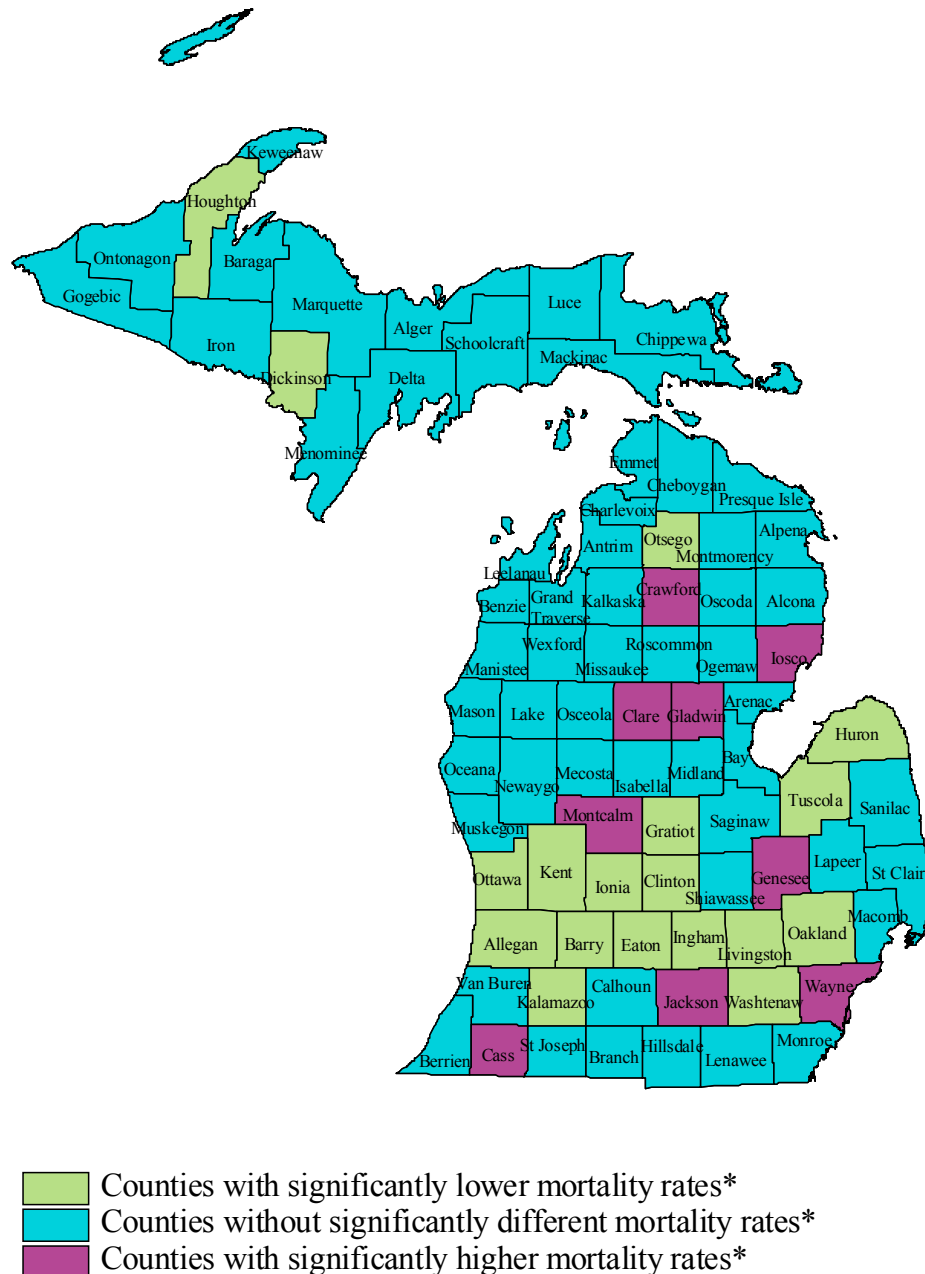
Table 30.

Numbers and Percentages of Invasive Lung Cancer (Primary Site) by Stage at Diagnosis and Race, Michigan Residents, 1999

	Total Number	Stage at Diagnosis							
		Localized		Regional		Distant		Unknown	
		Number	%	Number	%	Number	%	Number	%
Total	6,882	1,383	20.1	1,662	24.1	2,785	40.5	1,052	15.3
Blacks	966	174	18.0	204	21.1	445	46.1	143	14.8
Whites	5,841	1,193	20.4	1,442	24.7	2,312	39.6	894	15.3

Figure 11.

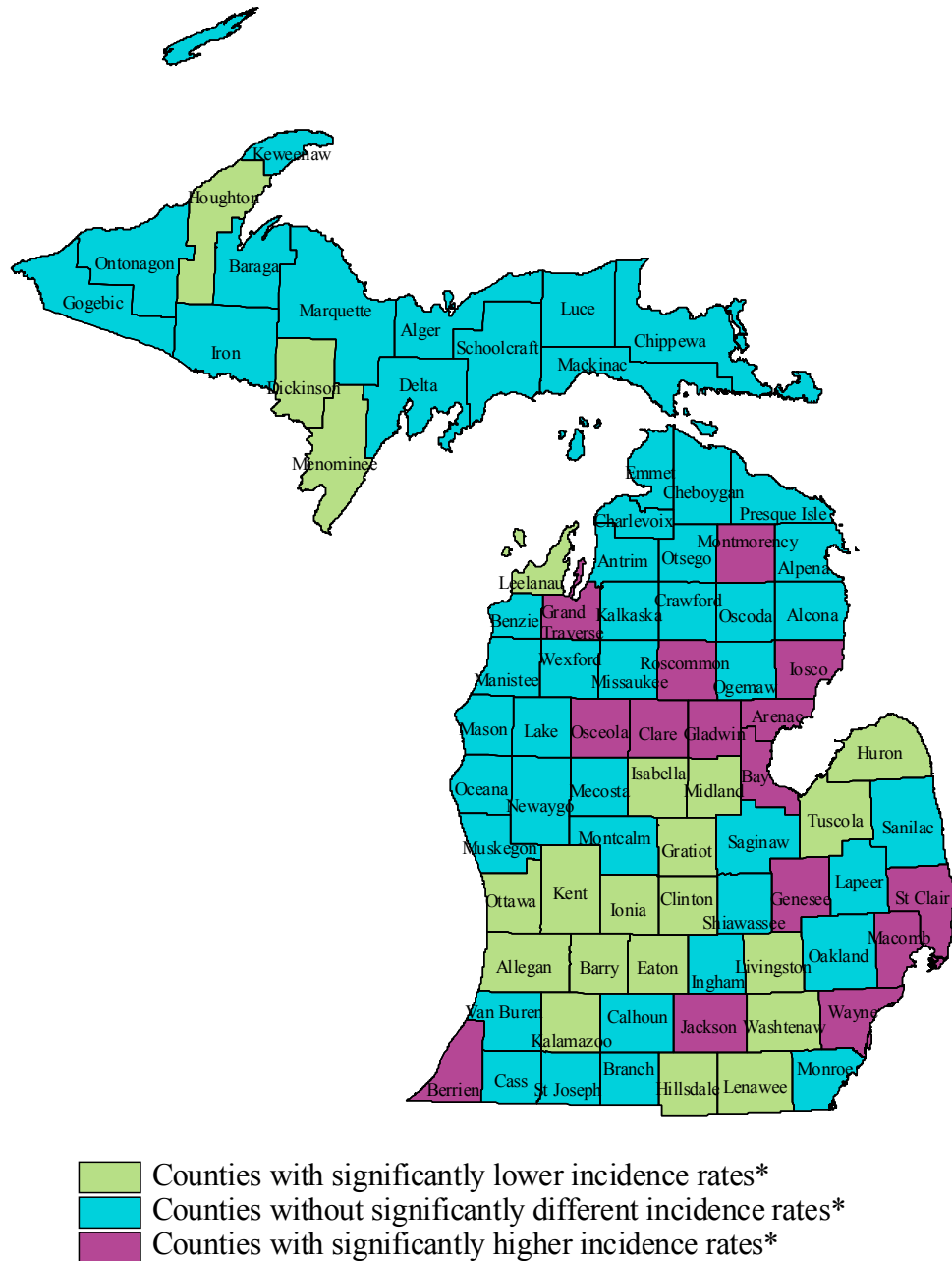
Lung Cancer Mortality Rates by County, 1991-2000



* Differences in age-adjusted mortality rates were statistically tested at 95% confidence levels to compare each county with all other counties combined.

Figure 12.

Lung Cancer Incidence Rates by County, 1990-1999



* Differences in age-adjusted incidence rates were statistically tested at 95% confidence levels to compare each county with all other counties combined.

Figure 13.

Percentage of Lung Cancer Cases Localized at Diagnosis by County

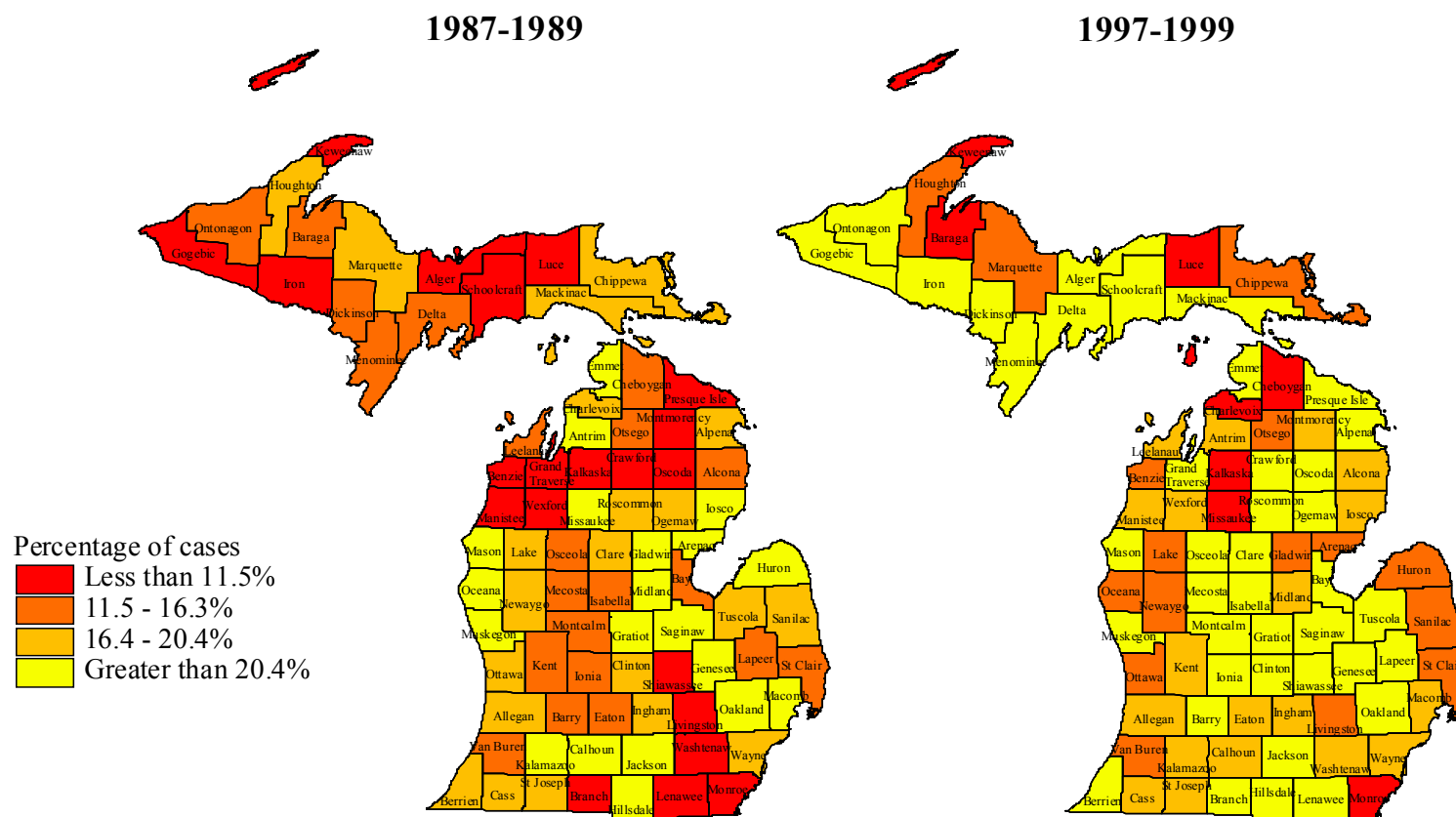


Table 31.

Number of Prostate Cancer Deaths and
New Prostate Cancer Cases by *Age Group*,
Michigan Residents

	All Ages	Under 35	35-54	55-74	75 and Over
Deaths, 2000	1,105	0	12	298	795
New Cases, 1999	8,327	1	680	5,315	2,330

Table 32.

Prostate Cancer Mortality Rates, Michigan 2000 vs. SEER 1999

	Number in Michigan	Age-Adjusted Rate*	
		Michigan (2000)	SEER (1999)
Total	1,105	32.4	31.1
Whites	902	30.0	28.6
Blacks	197	55.8	67.8

*Rate per 100,000 race- and gender-specific population.

Table 33.

Prostate Cancer Incidence Rates, Michigan 1999 vs. SEER 1999

	Number in Michigan	Age-Adjusted Rate*	
		Michigan (1999)	SEER (1999)
Total	8,327	201.3	174.8
Whites	6,660	181.9	167.8
Blacks	1,247	291.1	265.6

*Rate per 100,000 race- and gender-specific population.

Table 34.

Age-specific Prostate Cancer Mortality Rates, Michigan Residents, 2000

	Number	Rate*
25-39 Years	0	0.0
40-49 Years	3	0.4
50-64 Years	78	11.2
65 Years and Over	1,024	207.6

*Rate per 100,000 age- and gender-specific population.

Table 35.

Age-specific Prostate Cancer Incidence Rates, Michigan Residents, 1999

	Number	Rate*
25-39 Years	6	0.5
40-49 Years	197	26.3
50-64 Years	2,523	360.8
65 Years and Over	5,600	1,135.5

*Rate per 100,000 age- and gender-specific population.

Table 36.

Prostate Cancer Five-Year Relative Survival Rates by Stage and Race (SEER)

	Total %	White %	Black %
All stages	97.0	97.8	92.6
Localized/Regional	100.0	100.0	100.0
Distant	33.6	33.3	30.1
Unknown	88.2	89.0	85.3

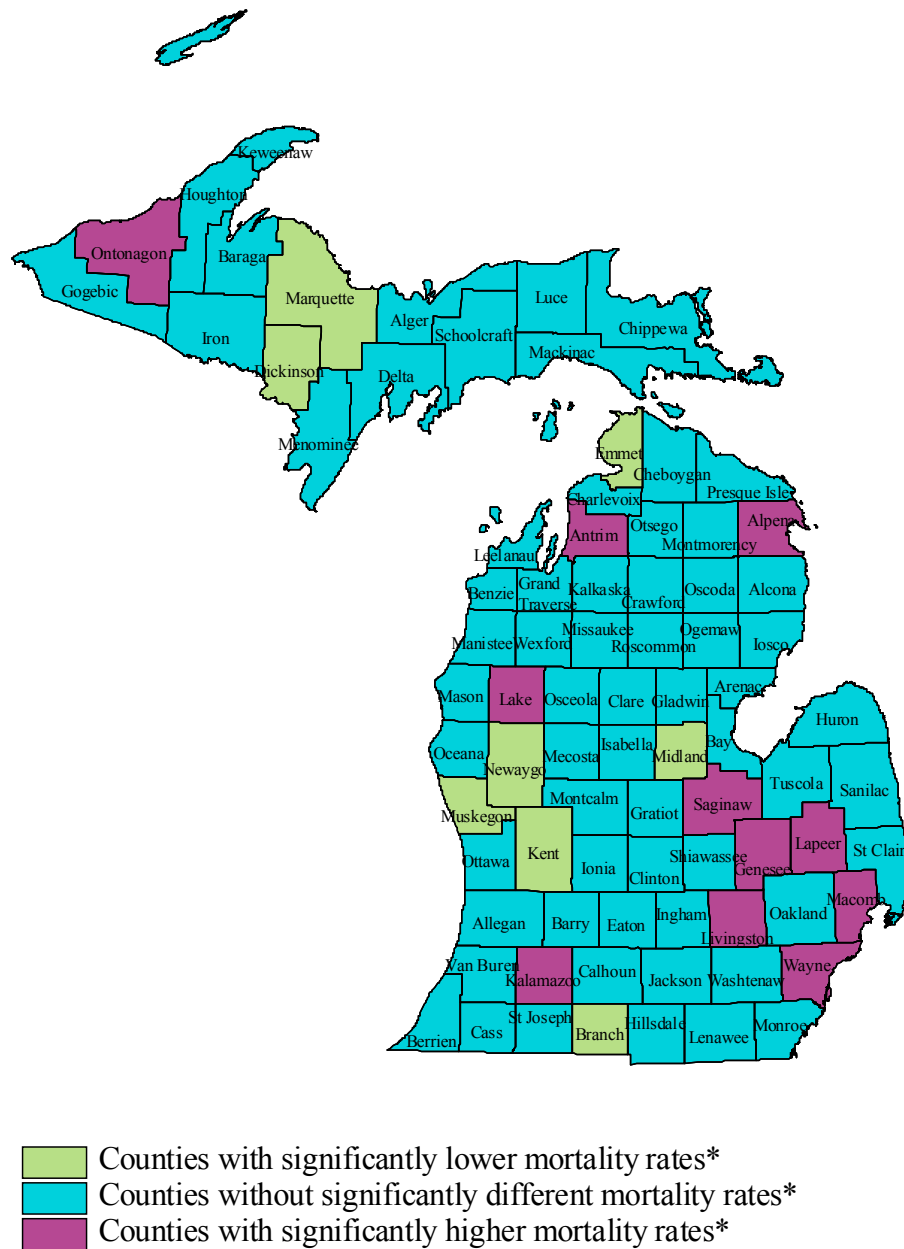
Table 37.

Numbers and Percentages of Invasive Prostate Cancer (Primary Site) by Stage at Diagnosis and Race, Michigan Residents, 1999

	Total Number	Stage at Diagnosis							
		Localized		Regional		Distant		Unknown	
		Number	%	Number	%	Number	%	Number	%
Total	8,327	6,090	73.1	722	8.7	204	2.4	1,311	15.7
Blacks	1,247	919	73.7	123	9.9	53	4.3	152	12.2
Whites	6,660	4,929	74.0	581	8.7	148	2.2	1,002	15.0

Figure 14.

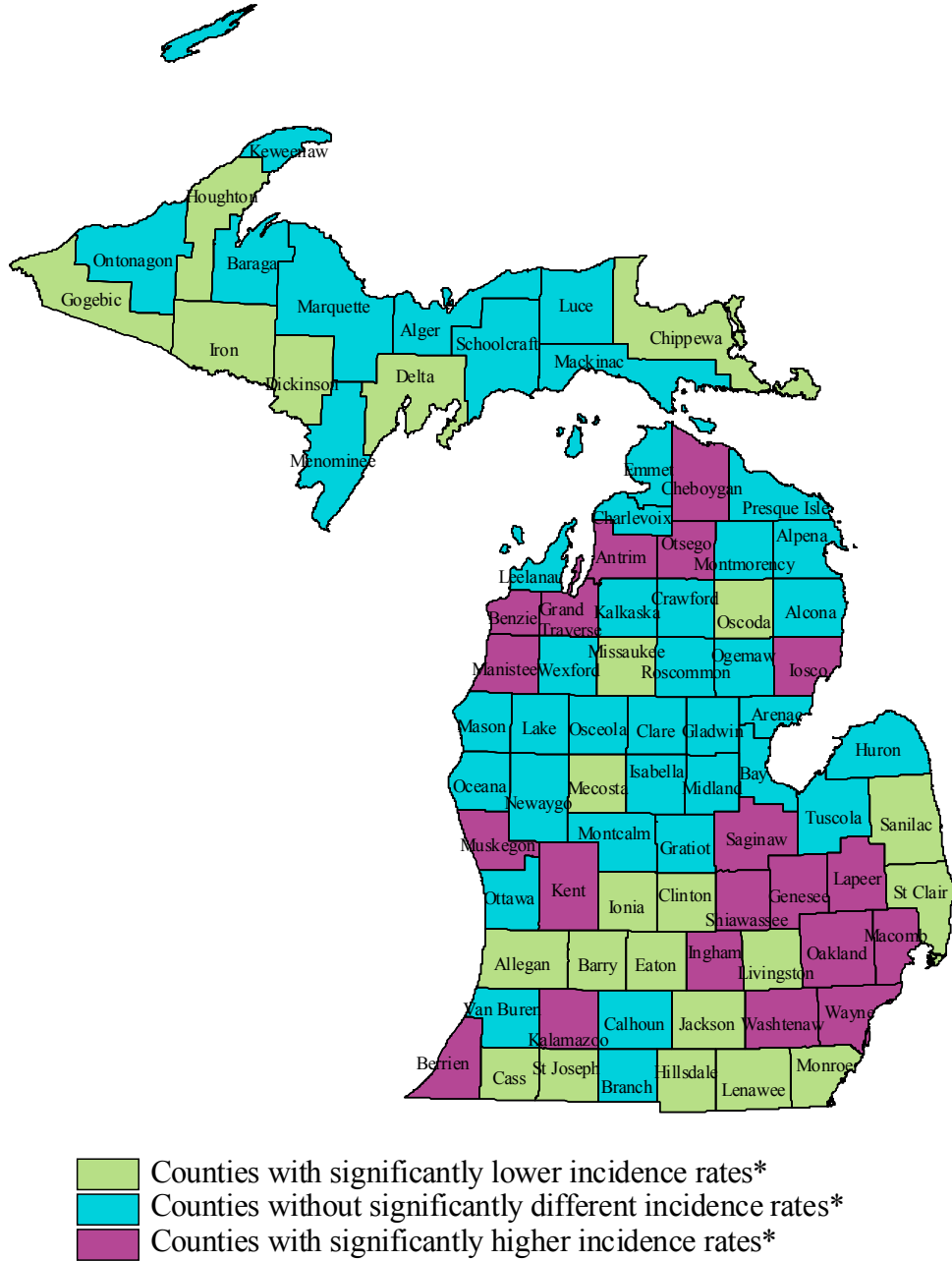
Prostate Cancer Mortality Rates by County, 1991-2000



* Differences in age-adjusted mortality rates were statistically tested at 95% confidence levels to compare each county with all other counties combined.

Figure 15.

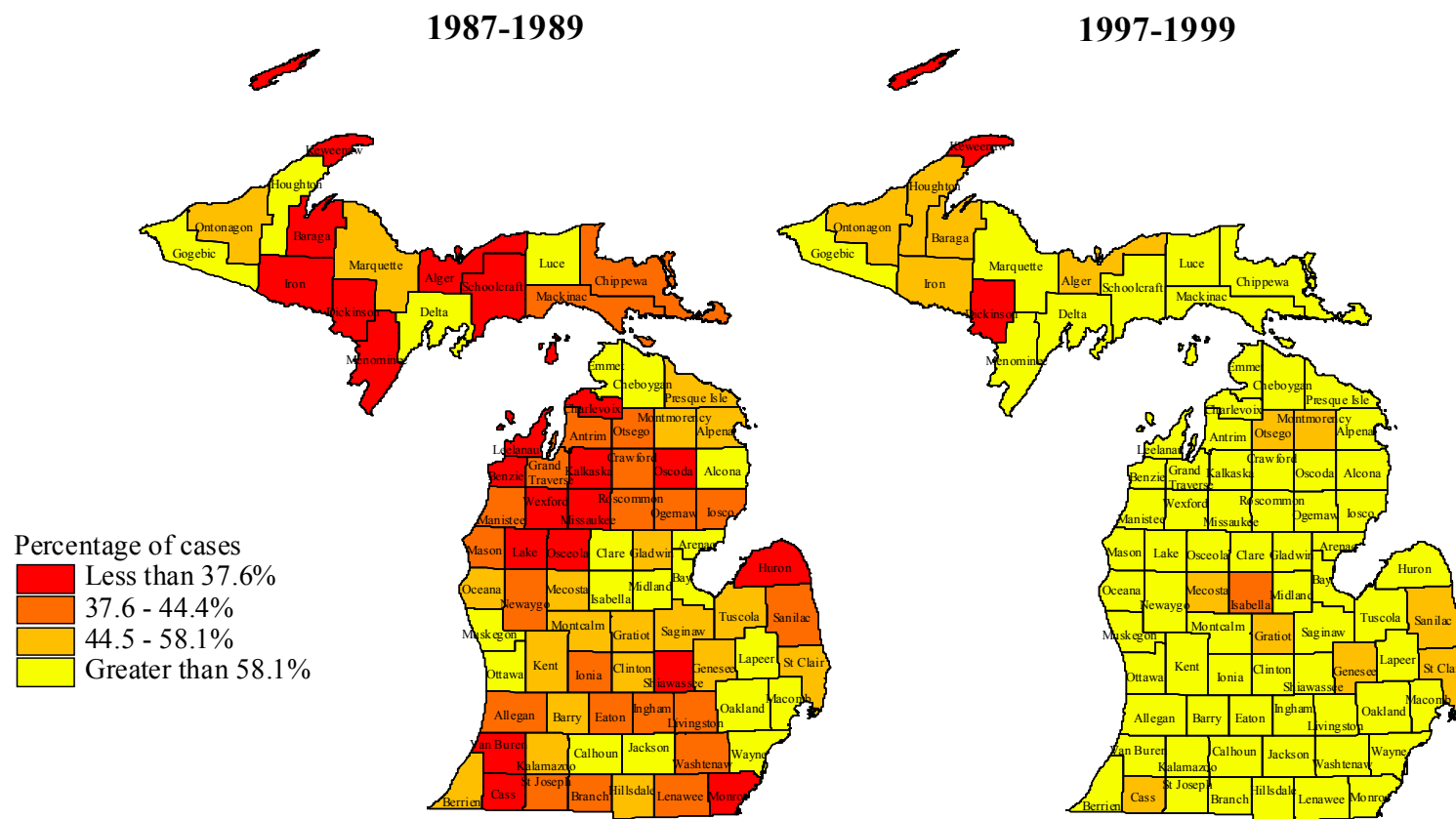
Prostate Cancer Incidence Rates by County, 1990-1999



* Differences in age-adjusted incidence rates were statistically tested at 95% confidence levels to compare each county with all other counties combined.

Figure 16.

Percentage of Prostate Cancer Cases Localized at Diagnosis by County



Time Trends

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Time Trends

Changes that occurred in the incidence of cancer and mortality due to cancer in Michigan over a sixteen-year period are illustrated in this section. Data on new cancer cases from 1985 to 1999 and deaths due to cancer from 1985 to 2000 were made available from the statewide cancer registry at the Michigan Department of Community Health.¹ The Estimated Annual Percent Change (EAPC) in age-adjusted incidence and mortality rates over multiple-year periods were calculated by regressing calendar year on the natural log of age-adjusted incidence and mortality rates.^{2,3} Rates were calculated by direct age-adjustment using the 2000 US population age distribution as the standard population.⁴ In the regression equation ($y=mx+b$), x =year and $y=\ln(\text{rate})$. The $EAPC=100*((e^m)-1)$. To test EAPC for statistical significance, t tests were used to test the hypothesis that the slope of the regression line is equal to zero, using two-sided $p=.05$. The EAPC in mortality rates was calculated over the period 1991 to 2000 and EAPC in incidence rates was calculated over the period 1990 to 1999.

The EAPC in mortality and incidence rates for Michigan and the United States over the period 1992 to 1999 are presented for comparison.⁵

Summary

Figures 1 through 3 show the EAPC in mortality rates for the total population, and for women and men for the relevant cancer sites. From 1991 to 2000, Michigan total mortality rates due to breast, cervical, colorectal, lung and prostate cancer all decreased. All changes were statistically significant at $p<.05$. Lung cancer mortality rates decreased among men, but increased among women (statistically significant changes at $p<.05$).

Figure 4 shows EAPC in mortality rates for Michigan next to EAPC in mortality rates for the United States. Over the time period 1992 to 1999, both Michigan and the United States had similar EAPC in rates for breast, colorectal, lung and prostate cancer. The greatest difference

1 Michigan Resident Cancer Incidence File including cases processed by November 28, 2001 and Michigan Resident Death Files, Michigan Department of Community Health (MDCH), Division for Vital Records and Health Statistics.

2 Annual state population estimates based on the actual size of the Michigan population in years 1985 through 1999 were used in calculating rates. Population data provided by the Department of Management and Budget, received December 19, 2000.

3 Wingo PA, Ries LAG, Giovino GA, Miller DS, Rosenberg HM, Shopland DR, Thun MJ, Edwards BK. Annual Report to Nation on the Status of Cancer, 1973-1996, With a Special Section on Lung Cancer and Tobacco Smoking. Journal of the National Cancer Institute. April 21, 1999; 91:8, 675-90.

4 Michigan Department of Community Health (MDCH), Division for Vital Records and Health Statistics.

5 Ries LAG, Eisner MP, Kosary CL, Hankey BF, Miller BA, Clegg L, Edwards BK (eds). SEER Cancer Statistics Review, 1973-1999, National Cancer Institute. Bethesda, MD, 2000. http://seer.cancer.gov/csr/1973_1999/, 2002. A continuing program of the National Cancer Institute (NCI), the SEER program collects data on a routine basis from designated population-based cancer registries in various areas of the country.

between Michigan's and the national EAPC in mortality rates was for cervical cancer mortality; Michigan's EAPC was -5.6%, compared to the national EAPC of -2.7%.

Figures 5 through 7 track yearly mortality rates for each cancer site from 1985 to 2000. The mortality rates among the total population and for women and men separately are followed over time.

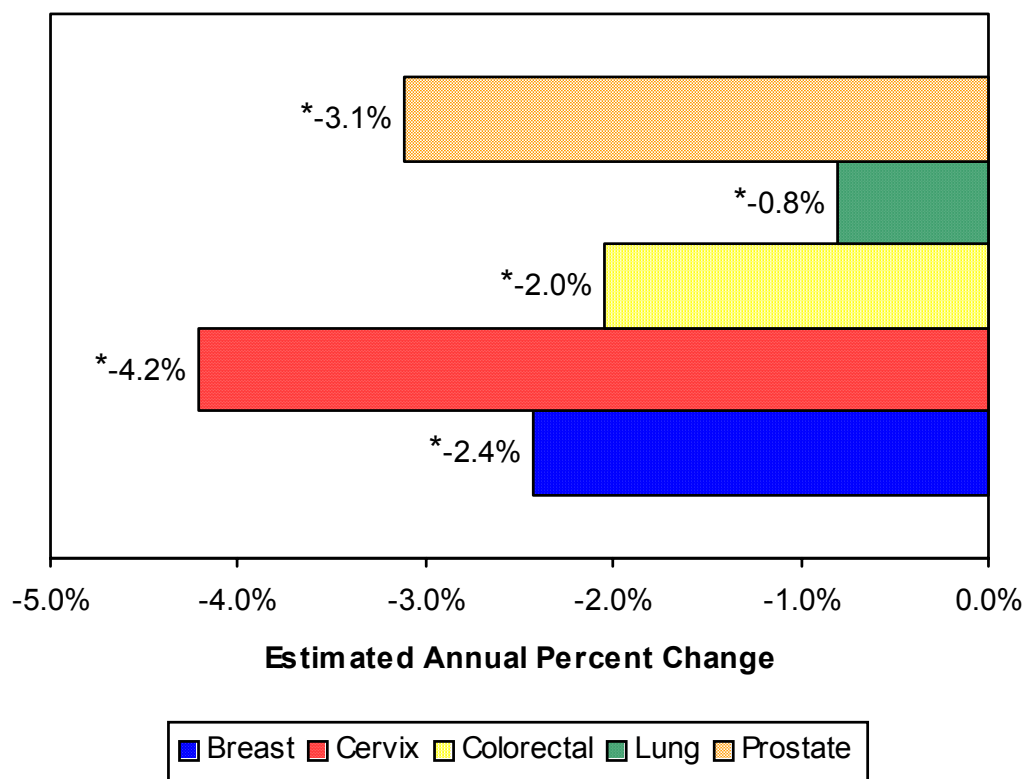
Figures 8 through 10 show the EAPC in incidence rates for the total population, women only and men only for the relevant cancer sites. In the period 1990 to 1999, breast, cervical, colorectal, lung and prostate cancer incidence rates in Michigan all decreased; the decrease in rate for each of these cancer sites with the exception of prostate cancer was statistically significant at $p < .05$. Although lung cancer incidence in the total population and among men decreased, the incidence rate among women increased (the increase was not statistically significant).

Figure 11 shows EAPC in incidence rates for Michigan next to EAPC in incidence rates for the United States. From 1992 to 1999, the EAPC in cervical cancer and colorectal cancer incidence rates was more negative for Michigan than for the United States. The EAPC in lung cancer and prostate cancer incidence rates were similar in Michigan and nationally. The greatest difference was for the EAPC in breast cancer incidence; Michigan's EAPC was -0.6%, while nationally the EAPC was 1.1% (although Michigan's EAPC was not statistically significant).

Figures 12 through 14 follow the yearly incidence rates by cancer site from 1985 to 1999 for the total population, and women and men separately.

Figure 1.

Estimated Annual Percent Change in Mortality Rates by Cancer Site, Michigan 1991-2000

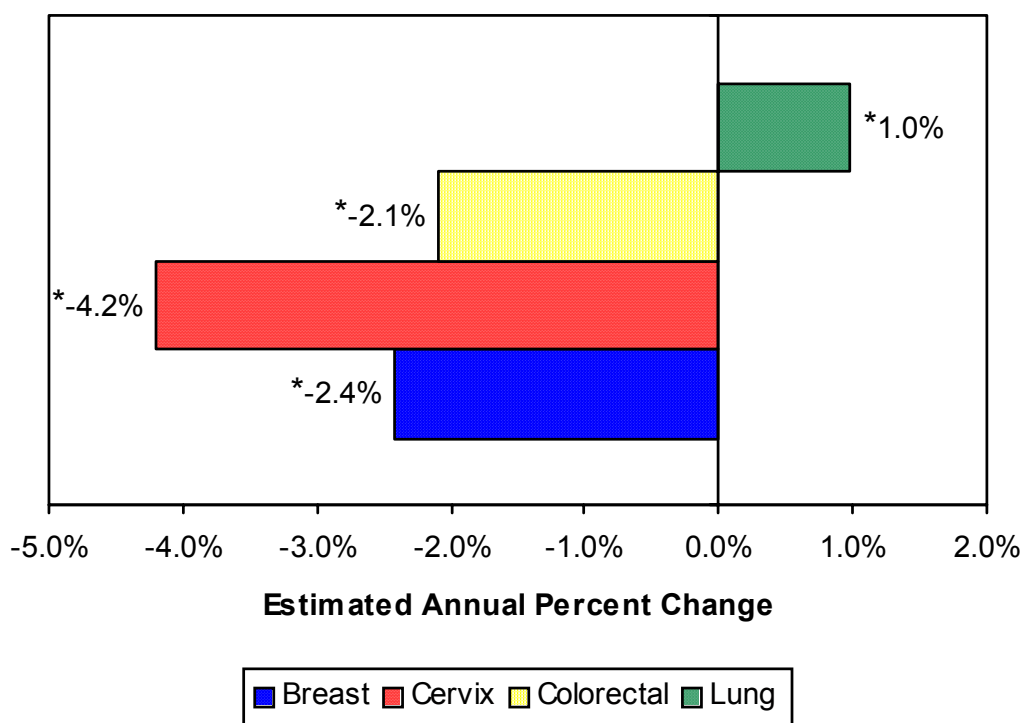


* The EAPC is significantly different from zero ($p < .05$).

Rates are age-adjusted and computed by gender for breast, cervical and prostate cancer.

Figure 2.

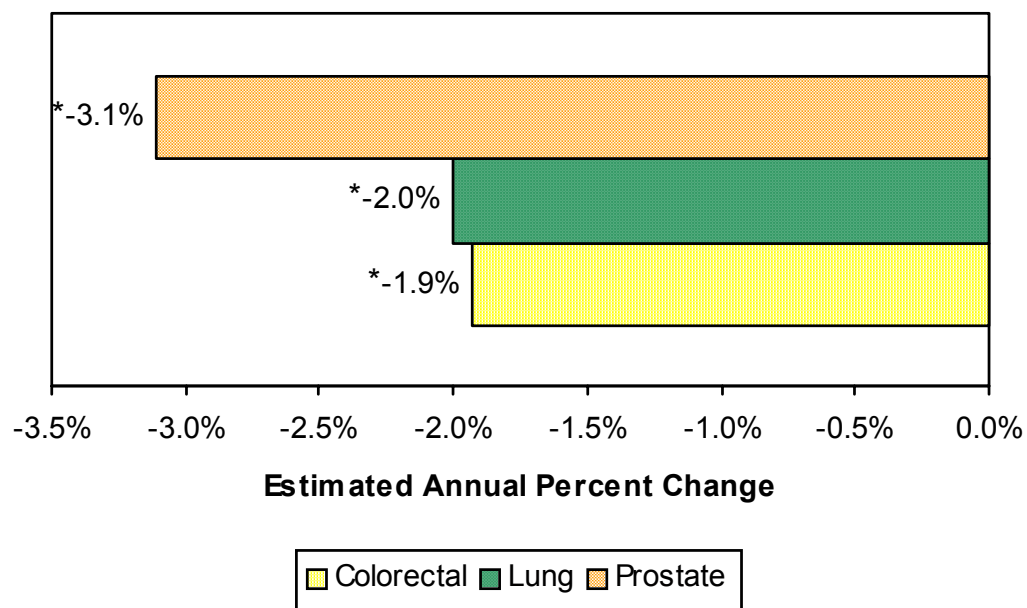
Estimated Annual Percent Change in Mortality Rates by Cancer Site, Michigan Females 1991-2000



* The EAPC is significantly different from zero ($p < .05$).
Rates are age-adjusted and computed by gender.

Figure 3.

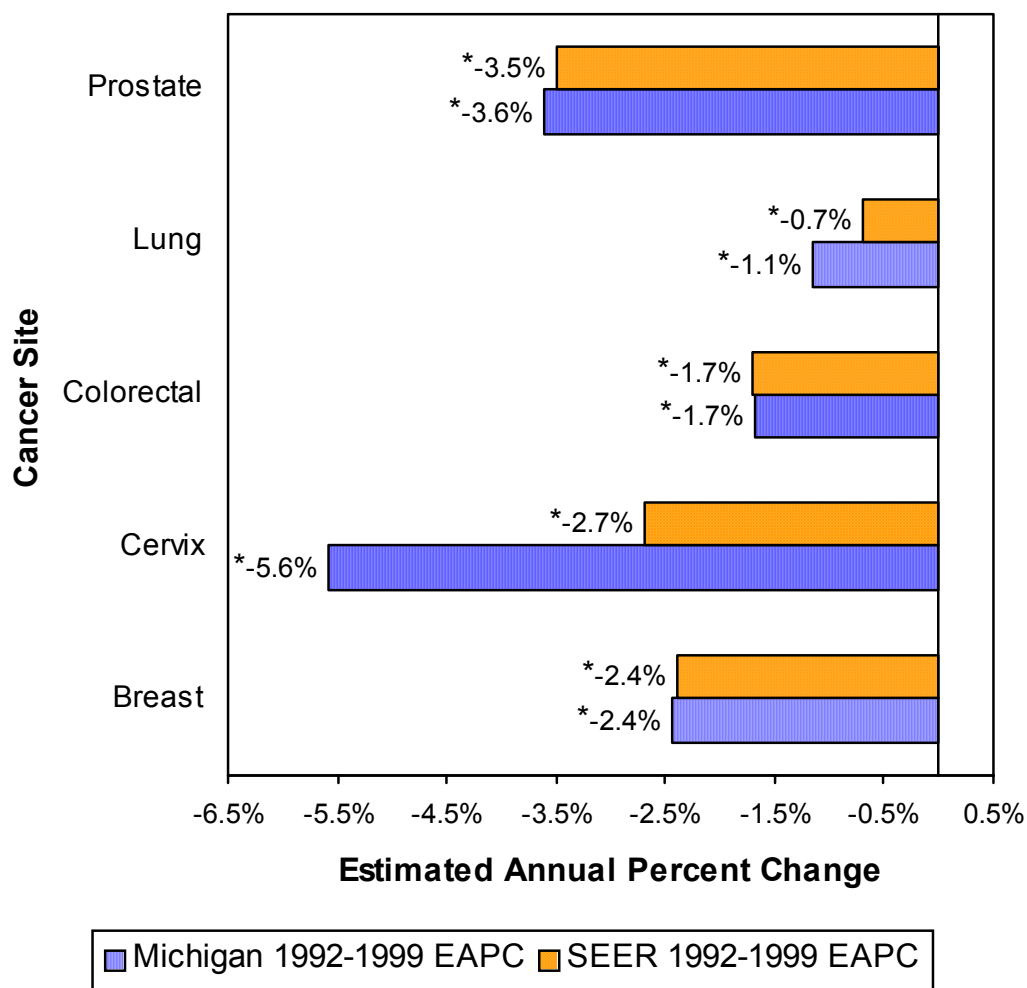
Estimated Annual Percent Change in Mortality Rates by Cancer Site, Michigan Males 1991-2000



* The EAPC is significantly different from zero ($p < .05$).
Rates are age-adjusted and computed by gender.

Figure 4.

Estimated Annual Percent Change in Mortality Rates, Michigan vs. SEER 1992-1999

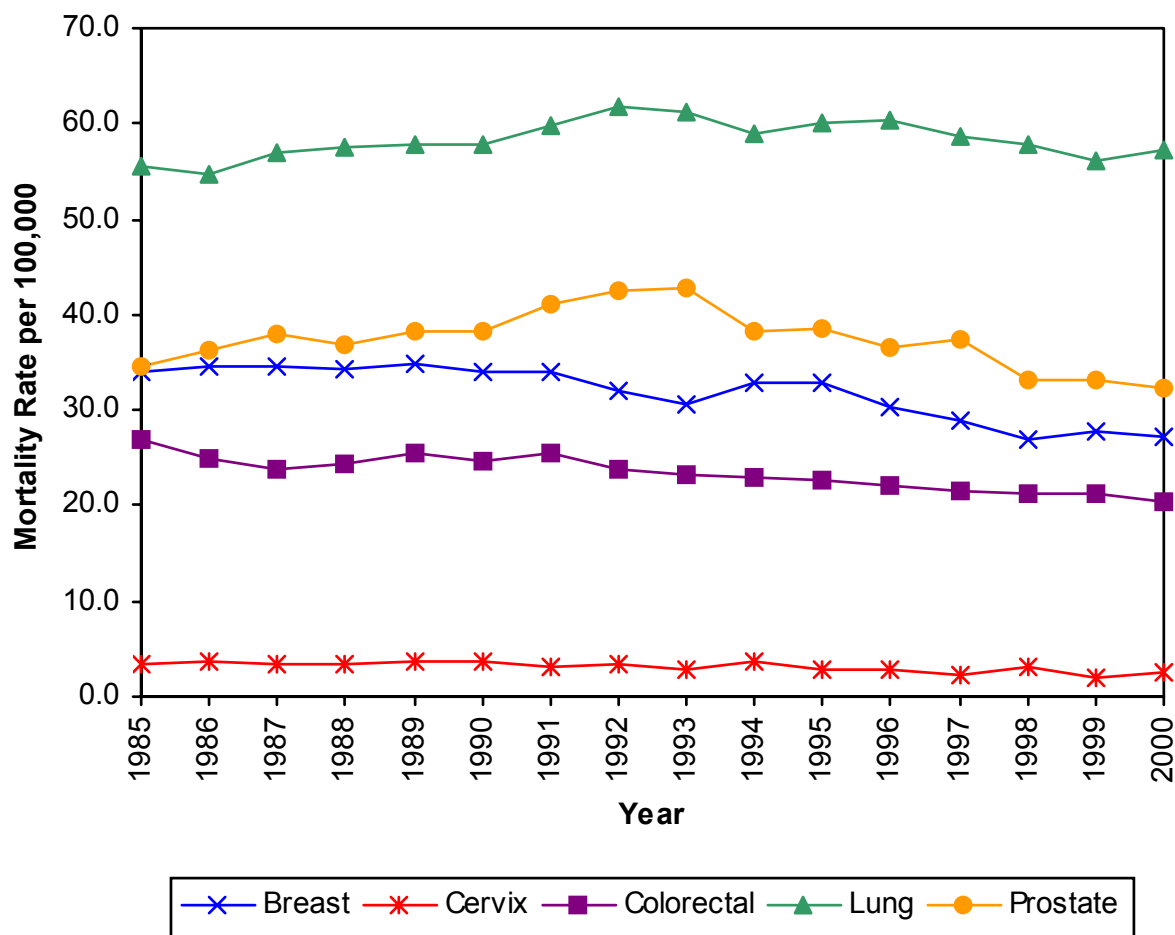


* The EAPC is significantly different from zero ($p < .05$).

Rates are age-adjusted and computed by gender breast, cervical and prostate cancer.

Figure 5.

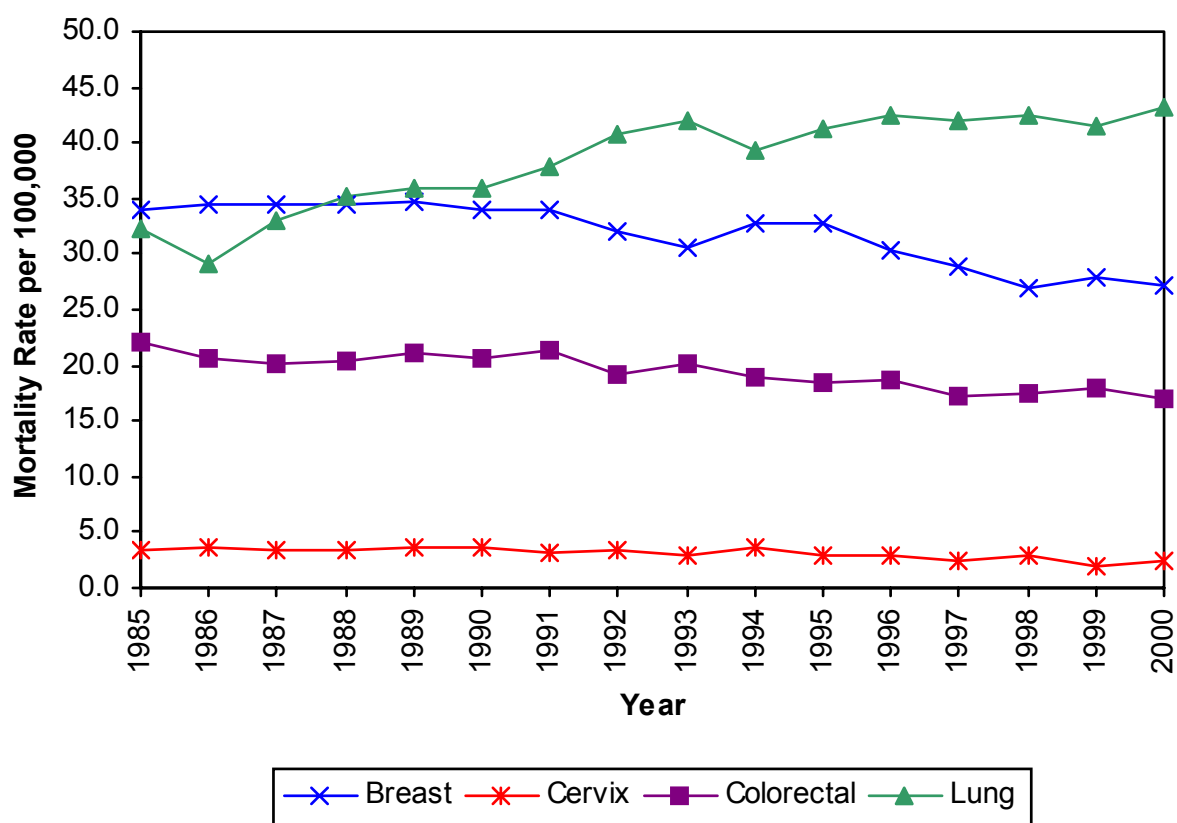
Total Mortality Rates by Cancer Site, Michigan 1985-2000



Rates are age-adjusted per 100,000 population and computed by gender for breast, cervical and prostate cancer.

Figure 6.

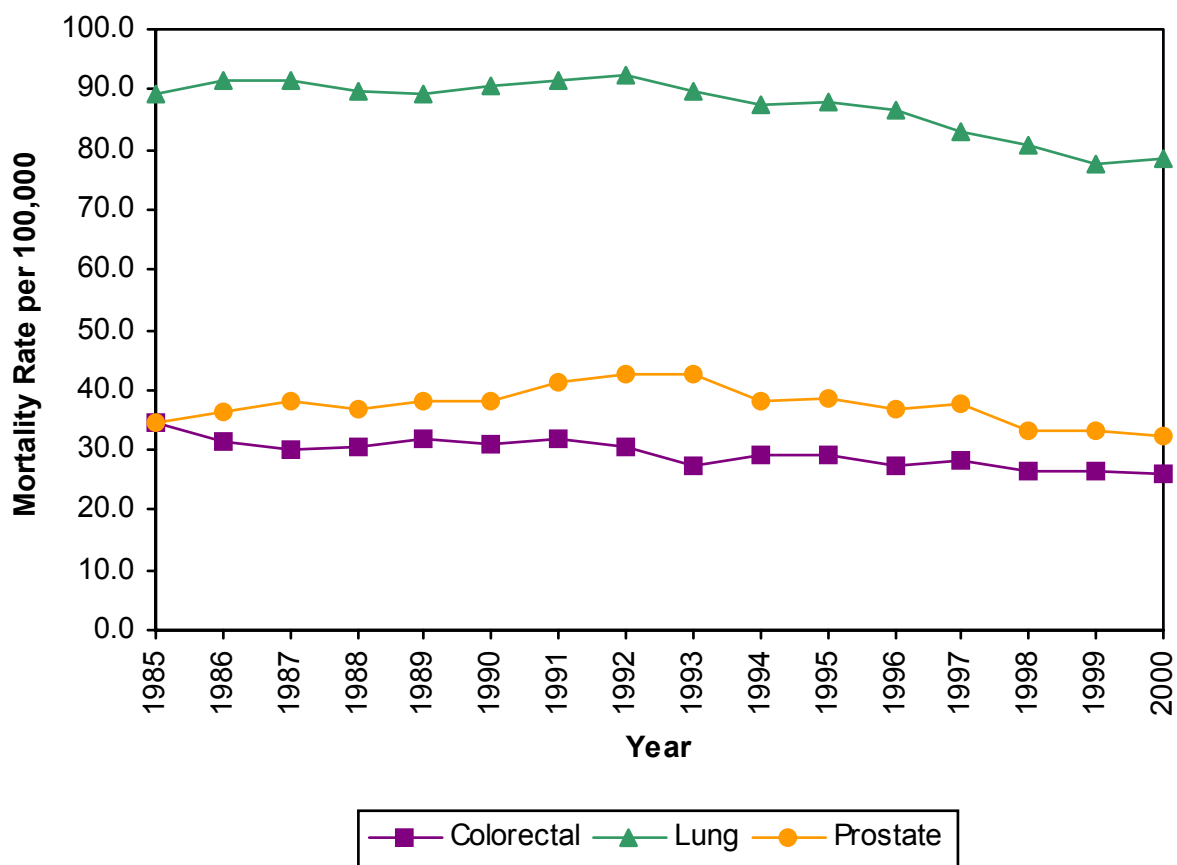
Female Mortality Rates by Cancer Site, Michigan 1985-2000



Rates are age-adjusted per 100,000 gender-specific population.

Figure 7.

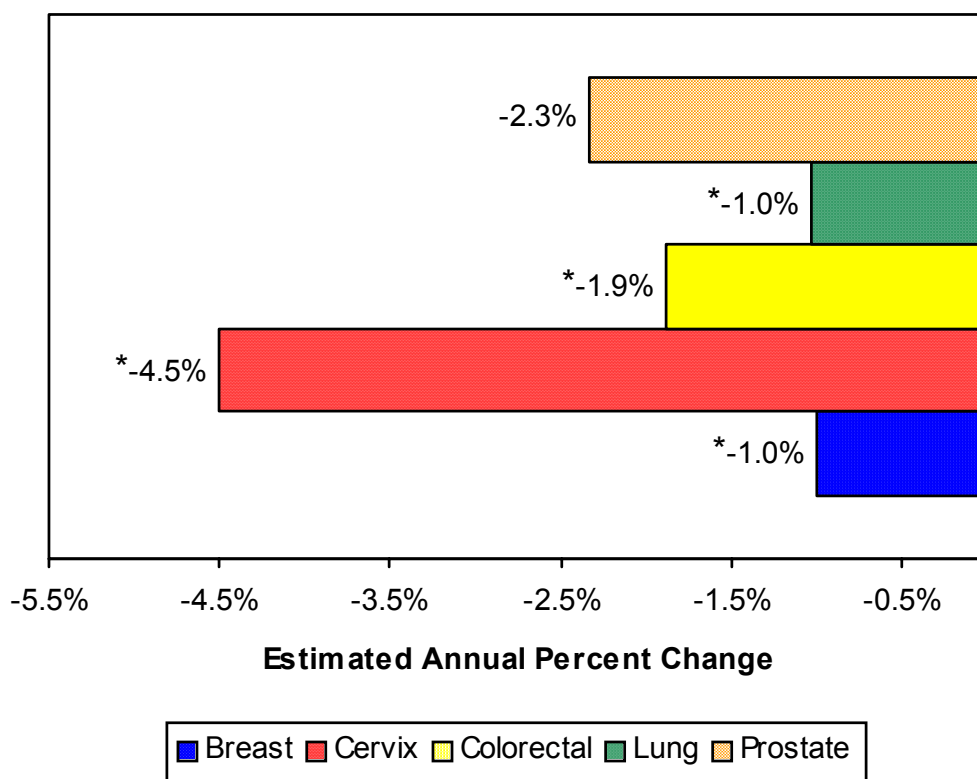
Male Mortality Rates by Cancer Site, Michigan 1985-2000



Rates are age-adjusted per 100,000 gender-specific population.

Figure 8.

Estimated Annual Percent Change in Incidence Rates by Cancer Site, Michigan 1990-1999

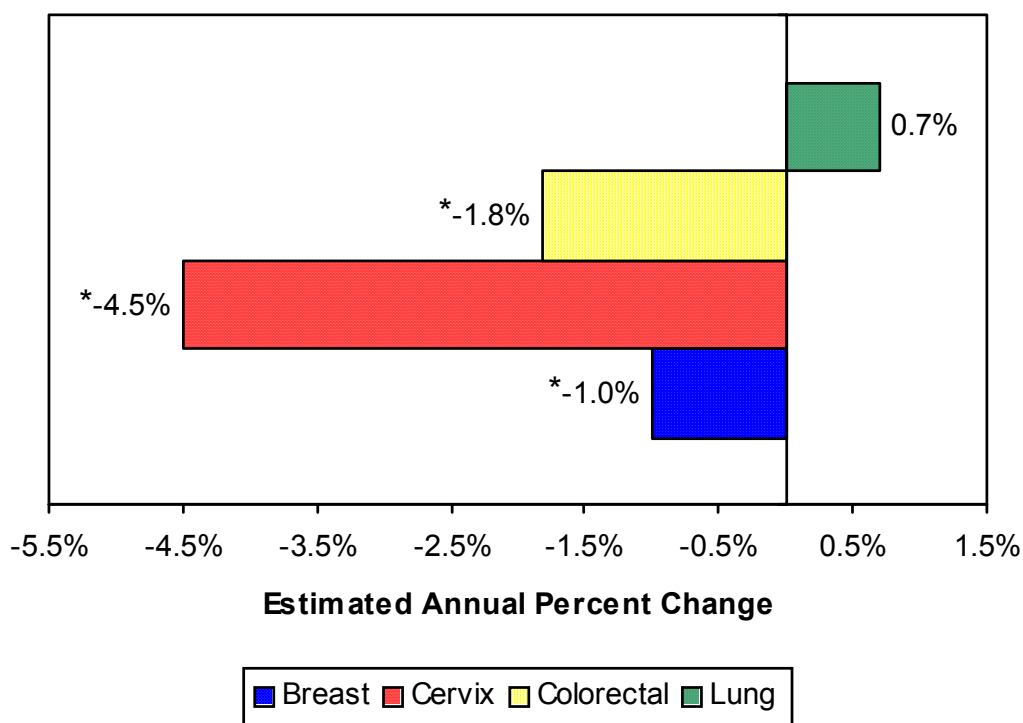


* The EAPC is significantly different from zero ($p < .05$).

Rates are age-adjusted and computed by gender for breast, cervical and prostate cancer.

Figure 9.

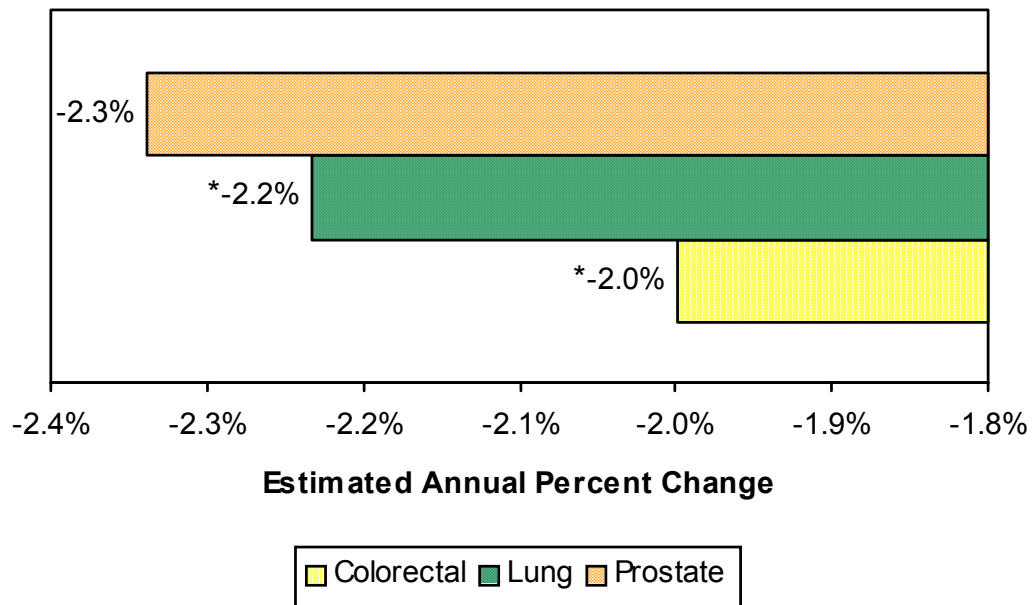
Estimated Annual Percent Change in Incidence Rates by Cancer Site, Michigan Females 1990-1999



* The EAPC is significantly different from zero ($p < .05$).
Rates are age-adjusted and computed by gender.

Figure 10.

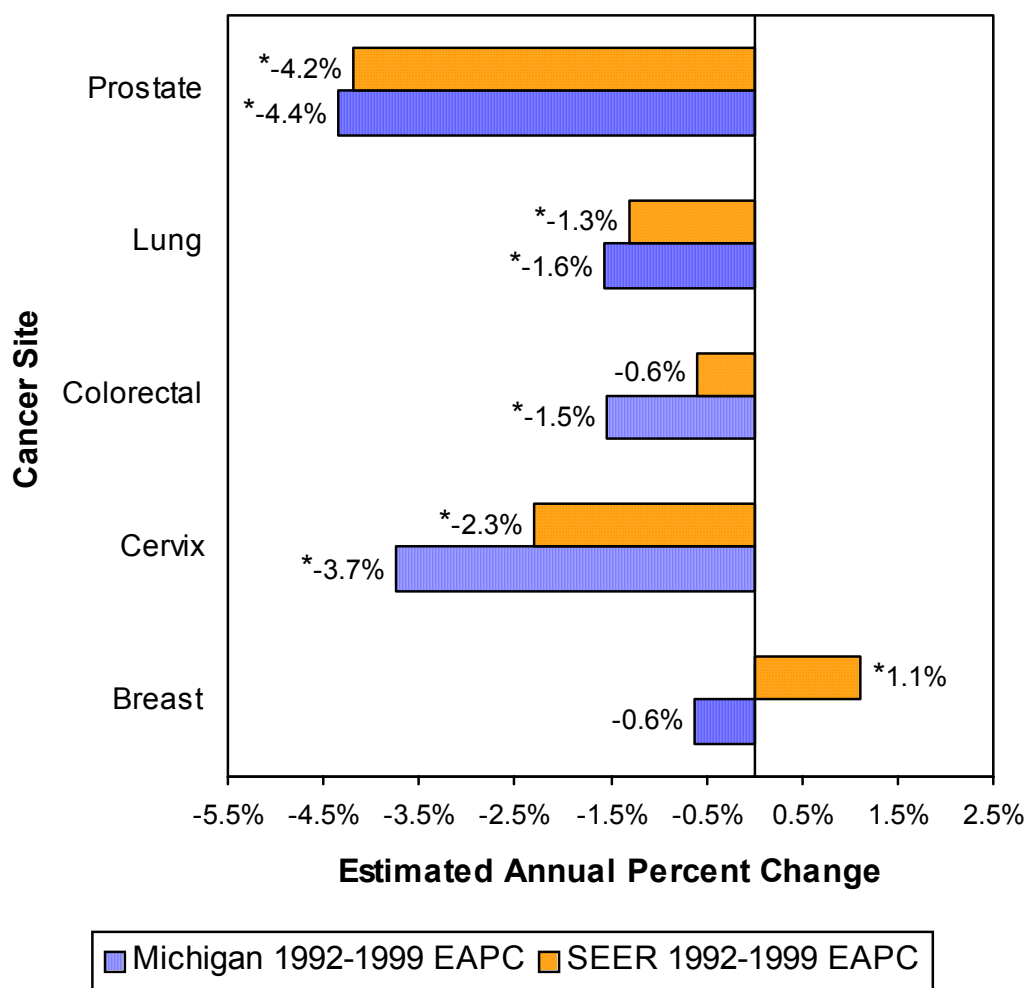
Estimated Annual Percent Change in Incidence Rates by Cancer Site, Michigan Males 1990-1999



* The EAPC is significantly different from zero ($p < .05$).
Rates are age-adjusted and computed by gender.

Figure 11.

Estimated Annual Percent Change in Incidence Rate, Michigan vs. SEER 1992-1999

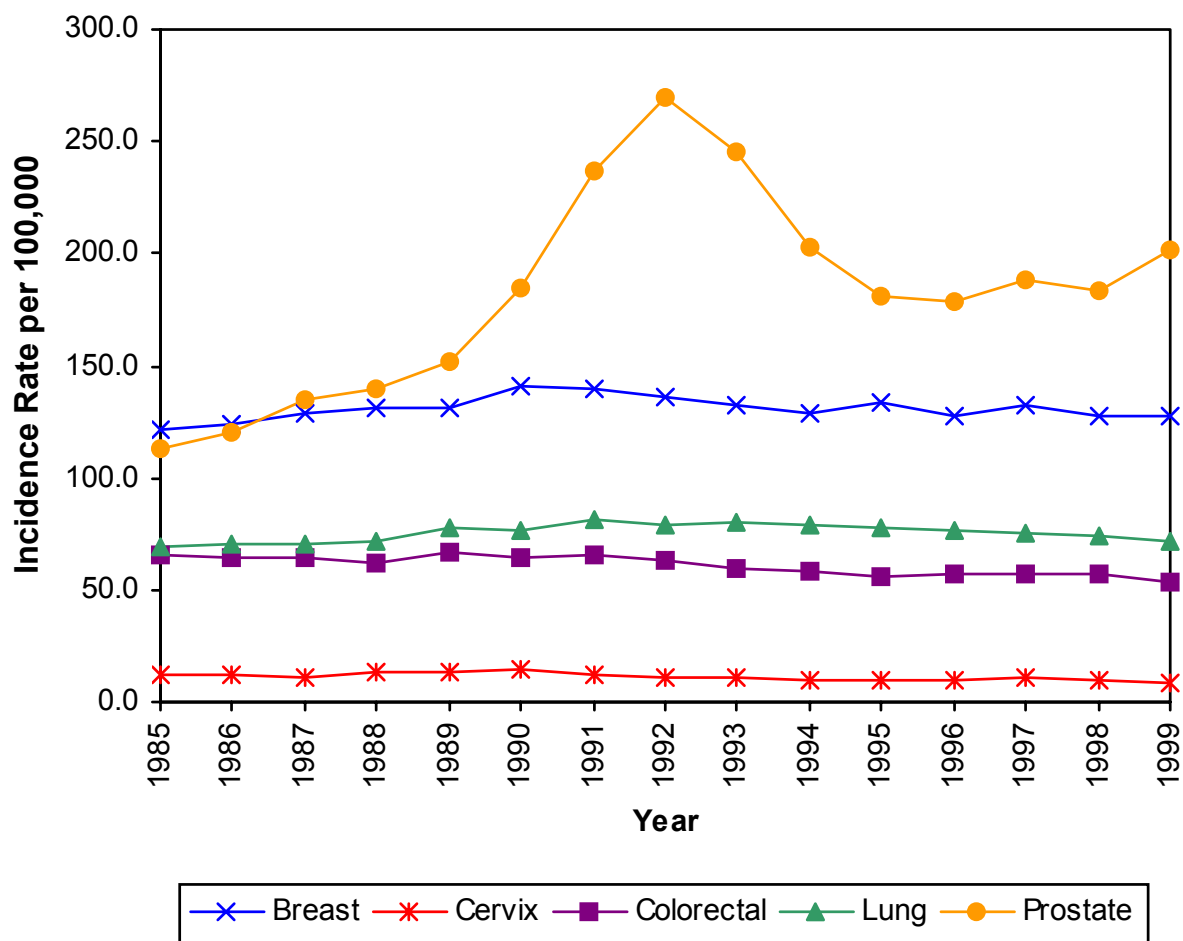


* The EAPC is significantly different from zero ($p < .05$).

Rates are age-adjusted and computed by gender for breast, cervical and prostate cancer.

Figure 12.

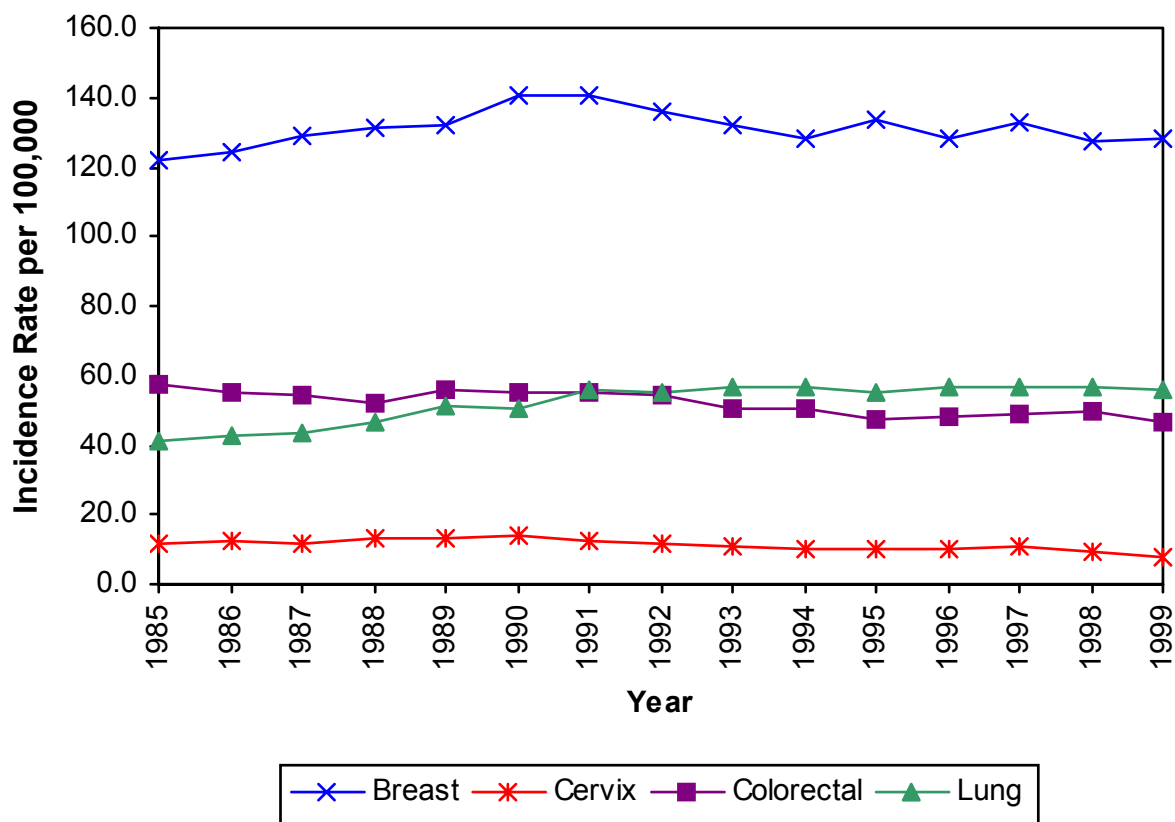
Total Incidence Rates by Cancer Site, Michigan 1985-1999



Rates are age-adjusted per 100,000 population and computed by gender for breast, cervical and prostate cancer.

Figure 13.

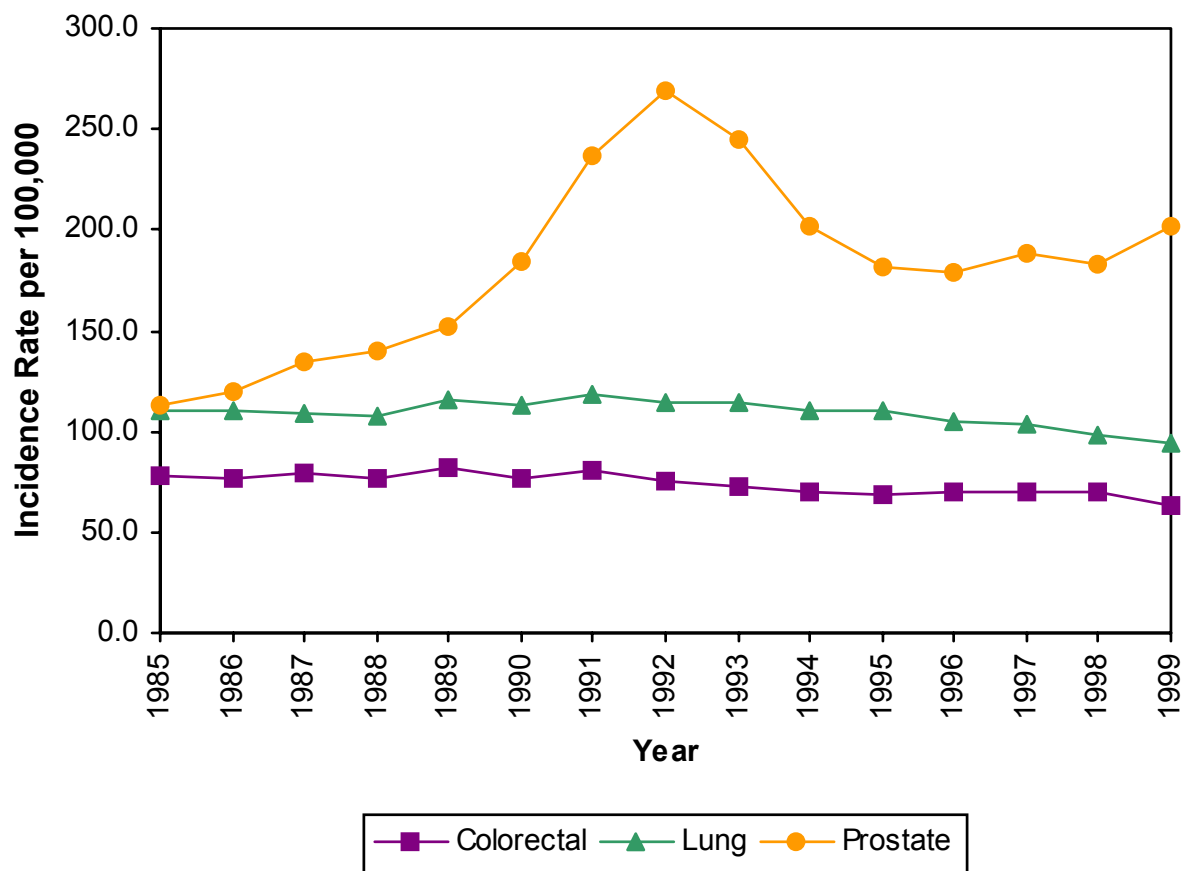
Female Incidence Rates by Cancer Site, Michigan 1985-1999



Rates are age-adjusted per 100,000 gender-specific population.

Figure 14.

Male Incidence Rates by Cancer Site, Michigan 1985-1999



Rates are age-adjusted per 100,000 gender-specific population.

Cancer-related Behavioral Risk Factors

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Cancer-related Behavioral Risk Factors

Certain behaviors such as screening and lifestyle choices are relevant to the incidence, morbidity and mortality of breast, cervical, colorectal, lung and prostate cancers; data collected on such behaviors are presented in this report. Also presented in this section are estimates of the total number of cancer cases attributable to certain risk factors for different cancer sites.

Behavioral Risk Factor Survey and Youth Risk Behavioral Survey

The Behavioral Risk Factor Survey (BRFS) is a state-level telephone survey that the Michigan Department of Community Health regularly conducts in cooperation with the Centers for Disease Control and Prevention (CDC). Each month a random sample of approximately 200 Michigan adults 18 years and older is interviewed. Survey instruments are designed so that a core set of questions dealing with some of the main BRFS risk indicators are asked each year while additional questions about areas of importance are rotated in and out of the protocol. This design allows for more precise estimates of major risk or health promotion behaviors as well as allowing for a broad range of questions to be included. The majority of data used in this report is data from the 2000 Michigan BRFS report.¹ For those questions that were not asked in the 2000 survey, data from the latest year available prior to 2000 have been utilized. Michigan BRFS reports are available to the public on the web through the Michigan Department of Community Health's page at http://www.michigan.gov/mdch/1,1607,7-132-2_944_5327-12702--,00.html.

The Youth Risk Behavior Surveillance System (YRBSS) was developed by the CDC to track the prevalence of health-risk behaviors among the nation's youth. The Youth Risk Behavior Survey (YRBS) has been conducted every other year by state and local education agencies across the United States since the spring of 1990 to assess the prevalence of six categories of health risk behaviors among youth grades nine through twelve. Michigan has administered this survey to students at randomly selected public schools across the state. Questions include many areas of risk behaviors from seatbelt use to illicit drug, alcohol and cigarette use, as well as questions about sexual behavior and other topics. Data from the 2001 Michigan YRBS were utilized for this report.²

¹ Behavioral Risk Factor Surveillance Survey (2000). Michigan Department of Community Health, *Health Risk Behaviors*, 1996-2000, 2001.

² Youth Risk Behavior Survey (2001). Centers for Disease Control and Prevention, Available: <http://www.cdc.gov/nccdphp/dash> [November 4, 2002].

Summary

Behavioral Factors Related to Cancer

Lifestyle plays a key role in determining cancer risk. Diets high in fat and low in fruits and vegetables, limited physical activity, and tobacco usage have been attributed to a large proportion of cancer deaths and are known risk factors for several different types of cancer.^{3,4}

The American Cancer Society (ACS) publishes nutrition guidelines to advise the public about dietary practices that reduce cancer risk. The ACS recommends adopting diets that contain ample amounts of fresh fruits and vegetables with limited amounts of fat and limited amounts of alcohol.⁴ Questions concerned with dietary habits were a part of the 1999 Michigan BRFSS. The average intake of fruits and fruit juices for Michigan adults was 1.6 times per day, while the consumption of vegetables averaged 2.2 times per day (Table 1). Adults reported consuming fruits and vegetables on a daily average of 3.8 times. Only 22.8% of adults (27.6% of women and 17.5% of men) reported eating five fruits and vegetables daily.

In the 1996 BRFSS, over one-quarter (27.5%) of respondents indicated they ate certain high-fat foods two or fewer times the previous day, 47.9% ate these foods three to five times, and 24.5% ate certain fatty foods six or more times in the previous day (Table 2).

Moderate to excessive alcohol consumption is believed to increase the risk of developing cancer.^{4,5} In the 1999 BRFSS, 59.0% of Michigan adults reported consuming any alcoholic beverage in the past month (Table 3). Men (9.5%) were seven times more likely than women (1.4%) to be heavy drinkers, consuming sixty or more alcoholic beverages in the past month. Nineteen percent (19.1%) of adults reported binge drinking, having had five or more drinks per occasion at least once within the past month (Table 4). Men (29.3%) were nearly three times more likely than women (9.9%) to report binge drinking at least once in the past month.

Physical activity and maintaining a healthy weight are other ACS recommendations to reduce cancer risk. In 2000, almost a quarter of adults (23.3%) did not participate in any physical activity within the past month (Table 5). About half of respondents (49.7%) said that they did not participate in leisure activities at least three times per week and nearly three-quarters (74.6%) reported no leisure activity five or more times per week in the past month. In 2000, 22.5% of Michigan adults were defined as being obese while 38.6% were defined as being overweight (Table 6). Weight estimates were based on body mass index (BMI) as calculated from the self-reported weight and height measurements.

3 Brownson, Ross C; Chronic Disease Epidemiology and Control, second edition, American Public Health Association, Washington DC, pp 335-373, 1998.

4 American Cancer Society (2001). Health Seekers Information [Online]. Available: www.cancer.org/eprise/main/docroot/HOME/SKR/SKR_0?level=0 [October 25, 2001].

5 Vogel, Victor G; "Breast Cancer Prevention: A Review of Current Evidence", CA Cancer J Clin, 50: 156-170, 2000.

Lifestyle habits, including diet and exercise, are also important for Michigan youth because lifetime patterns of food intake and physical activity begin in adolescence. Only 21% of students reported eating five or more servings of fruits and vegetables per day (Table 7). White students were more likely than black students to eat fruits and vegetables at least once within the past week (Table 7). Nearly a third of Michigan students (65%) reported participating in vigorous exercise, while 27% reported participating in moderate exercise. Over half of students (52%) reported participating in exercise to strengthen or tone muscles. Male students were more likely than female students to participate in vigorous and moderate exercise, as well as exercise to strengthen or tone muscles (Table 7). Based upon calculated BMI from self-reported weight and height measurements, 11% of the students were considered overweight.

Behavioral Factors Related to Breast Cancer

The Michigan Cancer Consortium (MCC) and the ACS recommend that women age 20 and older perform breast self-exams every month.^{4,6} Yearly mammograms and clinical breast exams should be initiated for women who are not at high risk at age 40. Women also should continue to perform monthly breast self-exams. Early detection through CBE and mammography continue to be an important opportunity to reduce morbidity and mortality due to breast cancer. In the 2000 Michigan BRFs, 91.4% of female respondents aged 20 and over reported ever having had a CBE for any reason, while 79.6% reported having had their last CBE within the time frame recommended by the ACS (Table 8).

Ninety-one percent (91.2%) of women aged 40 and over reported ever having had a mammogram, with 69.1% of these women having had their last mammogram within the past year (Table 9). In 2000, 58.4% of women 40 years and older reported receiving a CBE and mammography in accordance with current ACS guidelines. Women with less education and lower levels of income were less likely to have received a mammography and CBE within the past year (Table 9).

Comparisons across survey years show an increase of appropriately-timed breast screening by 8% from 1991 to 2000 and by 6% from 1997 to 2000, when the ACS changed the cancer detection guidelines to include yearly screening mammography for all women 40 years of age and older (Figure 1).

Behavioral Factors Related to Cervical Cancer

Current MCC recommendations, as well as ASC guidelines, are that all women should begin Pap tests starting at age 18 or at the age when sexual activity begins.^{4,7} Sexual activity includes any activity that puts the woman at risk for human papilloma virus (HPV), because infection with certain strains of HPV has been linked as an important risk factor for developing cervical

6 Michigan Cancer Consortium (MCC) Recommendations for Breast Cancer Screening, March 21, 2001 [Online]. Available at: http://www.michigan.gov/documents/breast_6751_7.pdf.

7 Michigan Cancer Consortium Recommendations for Cervical Cancer Screening, March 21, 2001 [Online]. Available: http://www.michigan.gov/documents/cervical_6750_7.pdf.

cancer.⁴ The MCC recommends that high risk women have annual Pap smear screening, and average risk women have screening every three years after three consecutive negative annual Pap smears. Pap screening is a valuable method of preventing serious complications and death from invasive cervical cancer. When detected at an early stage, invasive cervical cancer is one of the most successfully treatable cancers.⁸ In 2000, 94.8% of women in Michigan were estimated to have ever had a Pap test, with 86.2% of these women receiving a Pap test within the past three years (Table 10). Comparisons across survey years show an increase of 3% in appropriately-timed Pap screening from 1992 to 2000 (Figure 2).

Although there has been a slight increase across survey years in the overall percentage of women receiving appropriately-timed Pap screening, women in lower socioeconomic levels and with lower levels of education are less likely to have Pap screening. Of the women who reported less than \$20,000 in household income and less than a high school education, 76.1% and 71.7% received Pap screening within the past three years compared to the overall total of 86.2% (Table 10).

Early initiation of sexual intercourse, lack of condom use, and having multiple sexual partners are risk factors that significantly increase the risk of HPV infection and therefore, cervical cancer. In the 2001 YRBS, 40% of students reported ever having sexual intercourse, with 11% having had sexual intercourse with four or more people during their lives (Table 11). Three percent of all females reported sexual intercourse before age 13. Generally, black students reported greater sexual risk behaviors than white students. Overall, 58% of all black students reported having had sexual intercourse, while 37% of white students did. Twenty-one percent of black students versus 9% of white students reported having had sexual intercourse with four or more partners in their lives. Fifteen percent of male and female black students versus three percent of white students reported initiation before age thirteen. Of female students who had sexual intercourse during the previous three months, 56% reported using a condom during the last sexual intercourse.

Behavioral Factors Related to Colorectal Cancer

As mentioned above, diets high in fruits and vegetables and low in fat can reduce cancer risk. Considerable attention has been focused on the relationship between diet and colorectal cancer. The ACS recommends a diet high in fruits, vegetables, and high-fiber grains, along with exercise on a regular basis to reduce the risk of colorectal cancer.⁴

There are several different screening methods for early detection of colorectal cancer. Acceptable colorectal screening methods are a yearly fecal occult blood test (FOBT), a flexible sigmoidoscopy every five years, a double contrast barium enema every five to ten years or a colonoscopy every ten years. The ACS recommends that at the age of 50, men and women have a FOBT every year and flexible sigmoidoscopy every five years. The MCC also recommends men and women in this age group have a FOBT every year and flexible sigmoidoscopy every

⁸ American Cancer Society. *Cancer Facts & Figures 2002*, 2002.

five years, and also recommends as an alternate screening option either a colonoscopy every ten years or double contrast barium enema (DCBE) every five to ten years.⁹

In the 1999 BRFs, respondents age 50 and over were asked a series of questions related to colorectal cancer screening. Half of all adults 50 years and older (50.2%) reported ever having a blood stool test, however only 24.2% had had this test within the past year (Table 12). Nearly half of respondents (49.7%) had ever had a sigmoidoscopy or colonoscopy examination, but only 40.0% had had a sigmoidoscopy or colonoscopy within the past five years. Approximately one quarter of male (26.8%) and female (25.5%) adults reported having had a blood stool test within the past year while half of males (49.1%) and a third of females (32.7%) reported having had a sigmoidoscopy or colonoscopy within the past five years.

Behavioral Factors Related to Lung Cancer

Lung cancer is the leading cause of cancer death in Michigan. Although cigarette smoking has been linked to cause other types of cancer, it is the single most important risk factor in the development of lung cancer. According to the ACS, smoking causes 87% of lung cancer deaths.⁴ Thus prevention or cessation of smoking, as well as reducing exposure to environmental tobacco smoke, is a proven effective means of drastically reducing the risk of the disease.

In 2000, nearly one quarter (24%) of Michigan residents reported being a current smoker (Table 13). Generally, respondents with an education level of less than high school (35.8%) or high school graduate (30.0%) were more likely to smoke than respondents with education levels of some college (25.3%) and college graduate (10.8%).

Overall, 60.6% of current smokers reported smoking from one to 19 cigarettes per day, while 35.8% reported smoking from 20 to 39 cigarettes per day and 3.7% reported smoking 40 or more cigarettes per day (Table 14). The overall mean number of cigarettes smoked per day was 15.1. White adults averaged 16.0 per day, while black adults averaged 11.6 cigarettes per day. Generally, older respondents reported smoking an average of four more cigarettes per day than younger smokers (Table 14).

An individual who smokes can decrease his lung cancer risk with smoking cessation. The ACS estimates that a person who stops smoking for ten years can reduce their lung cancer risk to one-third of what it would have been if they continued to smoke. A series of questions regarding quitting behaviors among Michigan smokers were included in the 2000 BRFs. Fifty-nine percent (59.1%) of adult smokers reported trying to quit smoking for one day or longer in the past year (Table 15). Of the Michigan smokers who tried to quit smoking, a doctor had advised the smoker of smoking cessation programs in 52.7% of the individuals. From 1990 to 2000, the proportion of current smokers in Michigan decreased by 4.9% (Figure 3).

9 Michigan Cancer Consortium (MCC) Recommendations for Colorectal Cancer Screening, March 21, 2001 [Online]. Available: http://www.michigan.gov/documents/colorectal_6752_7.pdf.

Persons who begin smoking during adolescence increase their risk of lung cancer. In the 2001 Michigan YRBS, 64% of students reported having tried cigarette smoking (Table 18). White students were more likely than black students to report smoking cigarettes regularly (22% and 9%) and to report smoking two or more cigarettes on the days that they did smoke (19% and 7%). Males were more than twice as likely as females to ever have smoked cigars (21% and 8%). Of students who were current smokers, almost two-thirds (64%) reported they have tried to quit smoking in the past 12 months, suggesting that effective, targeted cessation services could be invaluable to helping reduce the risk of lung cancer.

Recent studies have shown a link between environmental tobacco smoke (ETS) and lung cancer as a causal relationship. Exposure to ETS causes an estimated 3,000 lung cancer deaths in the United States annually as well as 11,000 other cancers and 32,000 heart disease deaths,¹⁰ although it is not clear when exposure occurs (i.e., during childhood and/or adulthood) and what amount of exposure relates to lung cancer risk.¹¹ Since exposure at home is a major source of ETS by non-smokers, responses to smoking questions were analyzed by responses of whether children lived in the home and household smoking rules (Table 19). The 1995 BRFS found that as education and income level of households with children rise, proportion of children exposed to ETS declines (Table 20). Of all Michigan households, 10.9% reported a current smoker and any children in the home, and of those 91.2% reported smoking was allowed in some or all areas of the home; of all Michigan children, 26.8% or 716,003 were exposed to ETS in the home in 1996.¹² Although a significant proportion of Michigan's children (and adults) appear to be exposed, this item has not appeared in the questionnaire since 1995 and it's impossible to ascertain from the BRFS whether increasing awareness of ETS health issues have resulted in stricter household smoking guidelines.

Behavioral Factors Related to Prostate Cancer

Currently the effectiveness of prostate cancer screening methods is a topic of investigation. Because prostate cancer grows very slowly, there is question of whether treatment will help all men with prostate cancer live longer. The difficulty in creating recommendations for prostate screening is that finding and treating prostate cancer early may help some men to live longer, but will have no impact on the life span of other men and consequent prostate cancer treatments may have an effect on a man's quality of life causing side effects such as impotence and incontinence.⁴

Current methods for prostate cancer screening are digital rectal exams (DRE) and measurement of prostate-specific antigen (PSA). Generally, DRE is less effective than PSA but can find cancers in men with normal PSA levels and is useful to determine if the cancer has spread

10 Fontham, et. al., 1994. Environmental Tobacco Smoke and Lung Cancer in Nonsmoking Women. A Multicenter Study. *Journal of the American Medical Association*, June 88, 1994, 271(22): 1752-9.

11 Wells, Judson A., 1998. An Estimate of Adult Mortality in the United States from Passive Smoking." *Environment International*, 14:249-265.

12 State-Specific Prevalence of Cigarette Smoking Among Adults, and Children's and Adolescents' Exposure to Environmental Tobacco Smoke - United States, 1996. *MMWR*, Nov. 7, 1997, 46(44):1038-43.

beyond the prostate gland. PSA alone doesn't detect prostate cancer because elevated levels of PSA can be caused by other conditions. The ACS recommends men 50 years of age and older with at least a ten year life expectancy to have a PSA blood test and a digital rectal exam (DRE) annually.⁴ Men at high risk for prostate cancer (African-American men and men with family history) should begin screening at age 45.⁵

Questions regarding PSA testing among Michigan men aged 50 and older were included in the 1999 BRFS. Over half (51.5%) of the respondents, who have never been told they had prostate cancer, reported discussing PSA testing with their doctor, with nearly three-fifths of adults (58.5%) ever having had a PSA test (Table 19). Men with a lower household income and a lower education level (43.8%, 47.2%) reported discussing PSA testing less often than men with greater household income and education levels (58.8%, 55.1%).

Data on DRE among Michigan men were obtained from the 1995 BRFS. About eighty percent (79.6%) of men 40 years of age and older reported ever having had a DRE, and forty-five percent (45.2%) reported the procedure occurring in the past year (Table 20).

Cancer Cases Attributable to Risk Factors

Population attributable risk is an estimate of the proportion of disease in a total population that is a result of a single exposure. Population attributable risk may be unrealistic as a definitive number because completely eliminating a risk factor is very rare and because various risk factors may interact with each other. However, population attributable risk is a useful estimate to illustrate the burden in a population caused by a single risk factor. Based on estimates presented by Brownson et al., tobacco use is estimated to be responsible for approximately 87% of lung cancer cases in the United States.³ Using this estimate and the estimated number of new cases of lung cancer in Michigan, tobacco use can be attributed for over five thousand new lung cancer cases among Michigan residents in 2001 (Table 21). These estimates also reveal that physical inactivity and diets high in fat and low in fruits and vegetables account for thousands of new colorectal cancer cases in Michigan.

Table 1.

Daily Consumption of Fruits and Vegetables Among Michigan Adults, 1999

Demographic Characteristics	Mean Number of Times Fruit and Fruit Juices Consumed Per Day ^a	Mean Number of Times Vegetables Consumed Per Day ^b	Mean Number of Times Fruits and Vegetables Consumed Per Day	5 + Times Fruits & Vegetables Were Consumed Per Day ^c (%)
TOTAL	1.6	2.2	3.8	22.8
AGE				
18-24 Years	1.5	1.8	3.3	15.8
25-34 Years	1.4	2.0	3.4	17.3
35-44 Years	1.5	2.2	3.6	22.5
45-54 Years	1.5	2.2	3.7	20.1
55-64 Years	1.8	2.4	4.2	29.4
65-74 Years	1.9	2.4	4.3	27.9
75+ Years	2.1	2.7	4.7	42.5
GENDER				
Male	1.5	2.0	3.5	17.5
Female	1.7	2.3	4.0	27.6
RACE				
White	1.6	2.2	3.7	22.4
Black	1.7	2.1	3.8	23.5
EDUCATION				
Less than High School	1.6	2.1	3.6	22.8
High School Graduate	1.5	2.1	3.7	19.8
Some College	1.5	2.2	3.7	22.9
College Graduate	1.7	2.3	4.0	26.4
HOUSEHOLD INCOME				
< \$20,000	1.8	2.3	4.1	30.8
\$20,000-34,999	1.5	2.2	3.6	18.7
\$35,000-49,999	1.5	2.2	3.6	21.7
\$50,000-74,999	1.5	2.1	3.6	19.8
> \$75,000	1.6	2.2	3.8	23.6
^a Sum of reported frequencies of usual fruit and fruit juice consumption (two questions). ^b Sum of reported frequencies of usual consumption of green salad, potatoes, carrots, and all other vegetables (four questions). ^c Proportion of respondents whose total reported consumption of fruits (including juice) and vegetables was five or more times per day. Data were collected on the number of times per day rather than the number of servings per day that fruits and vegetables were eaten.				

Table 2.

Fat Consumption Among Michigan Adults, 1996

Gender/Age	Mean Daily Frequency of Eating Certain Fatty Foods ^a
TOTAL	3.7
Male	
18-50 Years	4.0
51+ Years	3.6
Female	
18-50 Years	3.6
51+ Years	3.5
<p>74.2% of respondents indicated that these responses were typical of their usual food intake, 18.1% said they never use fat-free foods instead of the regular version of common foods. On average, 2.6 meals were eaten in a restaurant or from restaurant take-out in the previous week.</p> <p>^a The high fat food categories asked about were: 1) pastries (donuts, croissants, danish or coffee cake), 2) bacon or sausage, 3) whole milk, 4) cheese or foods with cheese in them, 5) butter, margarine or creamy sauce, 6) deep fried foods (french fries, fried chicken or fried fish), 7) hot dogs, salami, bologna or lunchmeat, 8) hamburger, meatloaf, tacos or other ground beef dishes, 9) ice cream, and 10) cake, pie, and cookies. These categories are estimated to represent the source of approximately 50% of the fat consumed in the U.S. diet.</p>	

Table 3.

Alcohol Use Among Michigan Adults, 1999

Demographic Characteristics	Consumed Any in Past Month ¹ (%)	Heavy Drinking ² (%)
TOTAL	59.0	5.3
AGE		
18-24 Years	71.1	9.8
25-34 Years	65.5	5.4
35-44 Years	64.1	4.5
45-54 Years	59.6	5.4
55-64 Years	51.1	4.0
65-74 Years	45.9	4.6
75+ Years	34.0	2.7
GENDER		
Male	67.5	9.5
Female	51.2	1.4
RACE		
White	61.2	5.7
Black	46.9	4.0
EDUCATION		
Less than High School	41.3	6.3
High School Graduate	55.8	6.5
Some College	60.6	5.0
College Graduate	68.0	3.9
HOUSEHOLD INCOME		
< \$20,000	47.6	5.1
\$20,000-34,999	56.0	6.2
\$35,000-49,999	62.2	5.4
\$50,000-74,999	64.5	5.6
> \$75,000	75.4	4.1
¹ Proportion of respondents who reported having had at least one alcoholic drink in the past month. ² Heavy drinking was defined as sixty or more alcoholic beverages consumed in the past month.		

Table 4.

Binge Drinking Among Michigan Adults, 1999

Demographic Characteristic	Binge Drinking ¹ (%)
TOTAL	19.1
AGE	
18-34 Years	31.5
35-54 Years	17.1
55+ Years	7.6
GENDER	
Male	29.3
Female	9.9
RACE	
White	20.2
Black	15.0
EDUCATION	
Less than High School	14.4
High School Graduate	20.8
Some College	19.6
College Graduate	18.5
HOUSEHOLD INCOME	
< \$20,000	17.2
\$20,000-34,999	20.4
\$35,000-49,999	19.6
\$50,000-74,999	20.2
> \$75,000	22.4
¹ Proportion of respondents who reported that they had five or more alcoholic beverages per occasion at least once in the past month	

Table 5.

Leisure Time and Physical Activity Among Michigan Adults, 2000

Demographic Characteristics	No Activity ¹ (%)	<3 Times Per Week, 20 Minute Sessions ² (%)	<5 Times Per Week, 30 Minute Sessions ³ (%)
TOTAL	23.3	49.7	74.6
AGE			
18-24 Years	18.6	43.1	72.0
25-34 Years	20.8	51.0	74.2
35-44 Years	19.7	49.0	75.7
45-54 Years	25.5	52.8	78.2
55-64 Years	23.0	44.3	70.2
65-74 Years	27.4	48.5	70.7
75+ Years	38.3	61.5	78.6
GENDER			
Male	19.7	47.3	73.3
Female	26.6	51.9	75.7
RACE			
White	21.4	48.1	74.1
Black	33.5	58.9	77.8
EDUCATION			
Less than High School	33.0	62.2	79.9
High School Graduate	29.3	56.4	78.0
Some College	22.0	48.0	72.9
College Graduate	13.0	38.6	70.4
HOUSEHOLD INCOME			
< \$20,000	32.0	60.6	78.4
\$20,000-34,999	25.1	49.3	76.5
\$35,000-49,999	23.6	49.6	75.7
\$50,000-74,999	20.1	46.2	70.8
> \$75,000	14.0	40.6	70.3

¹ Proportion of respondents who said they did not participate in any physical activities, recreation or exercises in their leisure time (such as running, golf, or walking for exercise) within the past month.

² Proportion of respondents who said they did not participate in any physical activities (such as running, golf, or walking for exercise) three or more times per week for a minimum of 20 minutes per session, within the past month.

³ Proportion of respondents who said they did not engage in leisure-time physical activities (such as running, golf, or walking for exercise) for a minimum of 30 minutes 5 times per week, within the past month.

Table 6.

Weight Status¹ Among Michigan Adults, 2000

Demographic Characteristics	Obese (%)	Overweight (%)	Healthy Weight (%)	Underweight (%)
TOTAL	22.5	38.6	37.1	1.7
AGE				
18-24 Years	12.4	32.1	51.6	3.9
25-34 Years	19.1	39.4	40.3	1.1
35-44 Years	20.1	41.7	36.8	1.4
45-54 Years	33.9	33.4	31.5	1.1
55-64 Years	25.0	42.7	31.1	1.2
65-74 Years	29.0	41.9	27.9	1.2
75+ Years	15.8	40.3	40.5	3.4
GENDER				
Male	22.6	48.5	28.7	0.3
Female	22.4	28.9	45.5	3.2
RACE				
White	21.6	38.7	38.1	1.6
Black	29.9	37.2	30.3	2.5
EDUCATION				
Less than High School	24.0	40.4	32.5	3.1
High School Graduate	25.5	38.0	34.7	1.8
Some College	20.3	37.3	40.7	1.6
College Graduate	20.3	40.1	38.3	1.2
HOUSEHOLD INCOME				
<\$20,000	27.0	36.9	32.6	3.6
\$20,000-34,999	23.8	39.4	35.3	1.5
\$35,000-49,999	25.7	38.8	34.9	0.6
\$50,000-74,999	20.3	40.8	36.9	2.0
≥\$75,000	18.1	40.1	40.5	1.3
¹ Prevalence estimates for weight status were based on body mass index (BMI) as calculated from the self-reported weight and height measurements. Body mass index is defined as weight (in kilograms) divided by height (in meters) squared [weight in kg/(height in meters) ²]. Weight status categories were defined as follows: Obese BMI > 30, Overweight BMI 25.0 - 29.9, Healthy Weight BMI 18.5 - 24.9, and Underweight BMI < 18.5. Pregnant women were excluded from this analysis.				

Table 7.

Weight, Activity and Diet Indicators Among Michigan Youth, 2001

Behavior	MI (%)	Gender		Grades				Race	
		Male (%)	Female (%)	9 (%)	10 (%)	11 (%)	12 (%)	Black (%)	White (%)
Students at risk for becoming overweight	13	15	12	16	15	11	10	18	12
Students who are overweight	11	14	7	12	12	9	10	17	10
Describe themselves as slightly or very overweight	31	25	37	30	33	29	32	27	31
Vigorous exercise 3+ times of past 7 days (20+ minutes, made them sweat and breathe hard)	65	72	57	69	64	61	63	48	68
Moderate exercise 5+ times of past 7 days (30+ minutes, did not make them sweat or breathe hard)	27	30	24	28	27	25	29	20	28
Exercise to strengthen or tone muscles 3+ times of past 7 days	52	60	45	54	53	50	52	37	55
Ate fruit 1 or more times in past 7 days	85	83	87	83	85	86	88	73	87
Ate green salad 1 or more times in past 7 days	70	66	74	69	67	70	77	56	73
Ate potatoes 1 or more times past in 7 days	76	76	76	71	77	79	79	63	79
Ate carrots 1 or more times in past 7 days	54	54	54	51	50	57	61	29	59
Ate other vegetables 1 or more times in past 7 days	83	81	84	80	81	86	86	70	85
Ate 5+ servings of fruits & vegetables per day in past 7 days	21	22	19	21	20	20	22	17	21
Drank 3 or more glasses of milk per day in past 7 days	20	27	14	22	21	20	18	10	22
Shaded areas reflect statistically significant ($p < 0.05$) differences between percentages within a category, e.g., gender.									

Table 8.

Clinical Breast Exam Indicators Among Female Adults 20 Years of Age and Older¹ Michigan, 2000

Demographic Characteristics	Ever Had Clinical Breast Exam (%)	Had Appropriately-Timed Screening Clinical Breast Exam ² (%)
TOTAL	91.4	79.6
AGE		
20-29 Years	87.7	84.2
30-39 Years	96.8	94.0
40-49 Years	97.0	76.2
50-59 Years	94.7	80.8
60-69 Years	86.9	70.1
70 + Years	79.6	61.4
RACE		
White	92.8	80.3
Black	85.8	76.9
EDUCATION		
Less than High School	79.9	66.3
High School Graduate	89.9	75.4
Some College	92.6	80.7
College Graduate	97.0	88.7
HOUSEHOLD INCOME		
<\$20,000	82.1	67.2
\$20,000-34,999	92.4	80.6
\$35,000-49,999	93.8	84.5
\$50,000-74,999	97.1	86.8
>\$75,000	95.2	83.3
¹ n=1437 ² Proportion of female respondents 20 years of age and older whose last clinical breast exam was within the previous three years for women 20-39 years and within the previous year for women 40 years of age and older. Respondents whose last clinical breast exam was done because of breast cancer or other breast problems were not included in this analysis.		

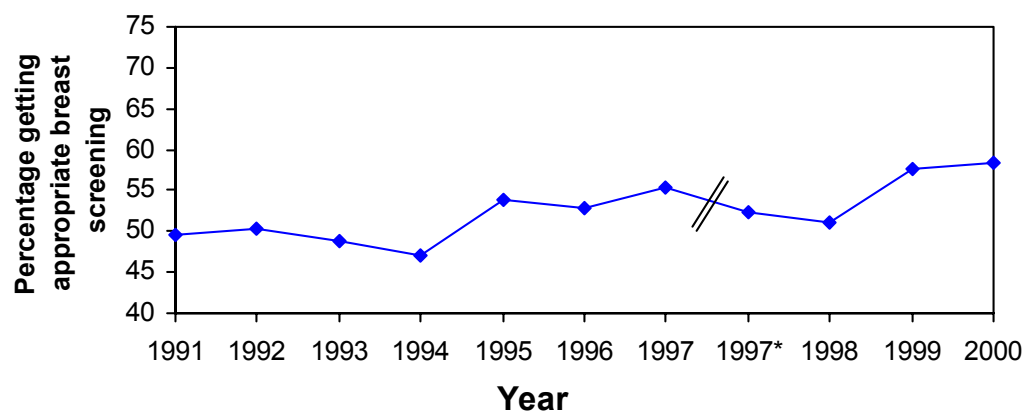
Table 9.

Mammography Use Among Female Adults 40 Years and Older¹ in Michigan, 2000

Demographic Characteristics	Ever Had Mammogram (%)	Mammography Screening in Past Year ² (%)	Mammography and Clinical Breast Screening in Past Year ³ (%)
TOTAL	91.2	69.1	58.4
AGE			
40-49 Years	86.8	58.9	53.1
50-64 Years	95.1	79.2	69.4
65+ Years	91.6	69.6	53.1
RACE			
White	90.8	68.6	59.2
Black	94.2	71.8	53.2
EDUCATION			
Less than High School	86.3	54.4	36.8
High School Graduate	93.0	71.8	57.6
Some College	90.2	66.1	57.7
College Graduate	91.9	74.8	69.8
HOUSEHOLD INCOME			
<\$20,000	85.7	56.5	43.2
\$20,000-34,999	92.5	73.3	58.0
\$35,000-49,999	86.5	66.6	60.9
\$50,000-74,999	95.9	74.9	68.7
≥\$75,000	94.1	70.4	63.9
¹ n=925 ² Proportion of female respondents 40 years and older who reported having had a routine mammogram within the past year. Respondents whose last mammogram was done because of breast cancer or other breast problems were not included in this analysis. ³ Proportion of female respondents aged 40 and older who had both a clinical breast exam and a mammography screening within the previous year.			

Figure 1.

Comparison Across Survey Years of Appropriately-Timed Breast Screening Among Michigan Women Aged 40 Years and Older



Year	Had Appropriately-Timed Screening (%)
1991	49.5
1992	50.2
1993	48.8
1994	47.0
1995	53.9
1996	52.9
1997	55.4, 52.4*
1998	51.2
1999	57.6
2000	58.4

* The ACS recommended time frame for appropriate mammography screening changed in 1997 to annually for all women 40 years of age or older. For all previous years, the recommendation was biannual screening for women aged 40 to 49 and annual screening for women aged 50+. As appropriate breast screening is a combination of appropriate CBE and appropriate mammography, this indicator changed as well.

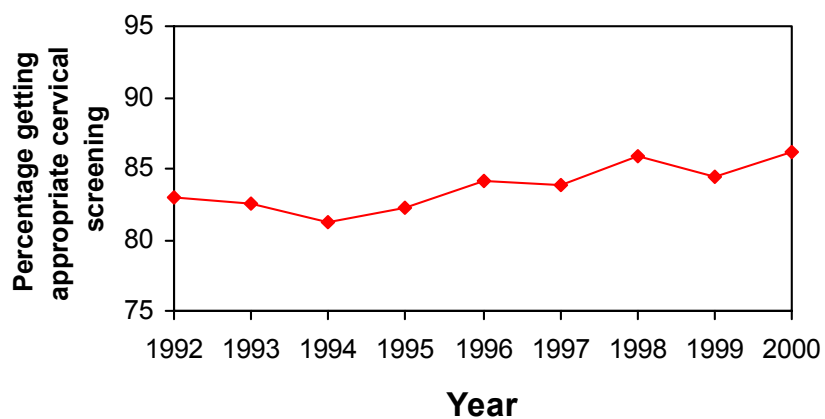
Table 10.

Cervical Cancer Screening Among Women 18 Years and Older¹ in Michigan, 2000

Demographic Characteristics	Ever Had Pap Test (%)	Pap Screening Within Past 3 Years ² (%)
TOTAL	94.8	86.2
AGE		
18-29 Years	84.4	81.8
30-39 Years	98.8	94.2
40-49 Years	99.1	92.6
50-59 Years	98.0	91.3
60-69 Years	97.5	84.2
70+ Years	92.4	66.9
RACE		
White	94.9	86.0
Black	94.1	86.5
EDUCATION		
Less than High School	88.4	71.7
High School Graduate	95.6	86.1
Some College	94.6	85.3
College Graduate	96.7	92.4
HOUSEHOLD INCOME		
<\$20,000	90.8	76.1
\$20,000-34,999	96.4	84.2
\$35,000-49,999	96.6	91.8
\$50,000-74,999	98.6	93.7
≥\$75,000	94.4	89.6
¹ n=1473		
² Respondents whose last Pap test was done because of a problem were not included in this analysis.		

Figure 2.

Comparison Across Survey Years For Cervical Cancer Screening Among Michigan Women



Year	Had Appropriately-Timed Screening (%)
1992	83.0
1993	82.5
1994	81.2
1995	82.2
1996	84.1
1997	83.8
1998	85.8
1999	84.4
2000	86.2

Table 11.

Sexual Intercourse Behaviors Among Michigan Youth, 2001

Behavior	MI (%)	Gender		Grades				Race	
		Male (%)	Female (%)	9 (%)	10 (%)	11 (%)	12 (%)	Black (%)	White (%)
Percentage of students who ever had sexual intercourse	40	38	42	26	37	44	59	58	37
Percentage of students who had sexual intercourse for the first time before age 13	5	6	3	7	6	3	4	15	3
Of students who had sexual intercourse during the past three months, % who had used a condom during last sexual intercourse	61	67	56	65	60	62	59	66	61
Percentage of students who had sexual intercourse with four or more people during their lives	11	11	10	7	10	10	16	21	9
Shaded areas reflect statistically significant ($p < 0.05$) differences between percentages within a category, e.g., gender.									

Table 12.

Colorectal Cancer Screening Among Michigan Residents 50 Years of Age and Older¹, 1999

Demographic Characteristics	Ever Had Blood Stool Test ² (%)	Had Blood Stool Test in Past Year ³ (%)	Ever Had Sigmoidoscopy/Colonoscopy ⁴ (%)	Had Sigmoidoscopy/Colonoscopy Test in Past Five Years ⁵ (%)
TOTAL	50.2	24.2	49.7	40.0
AGE				
50-59 Years	42.8	21.5	40.5	32.0
60-69 Years	56.3	26.8	55.1	43.5
70+ Years	54.5	25.5	56.6	47.0
GENDER				
Male	48.4	26.8	57.6	49.1
Female	51.7	25.5	43.4	32.7
RACE				
White	51.0	23.8	50.3	40.4
Black	44.1	25.3	45.6	37.7
EDUCATION				
Less Than High School	44.8	25.2	47.7	38.4
High School Graduate	45.0	21.3	42.8	34.3
Some College	57.3	27.2	54.0	41.8
College Graduate	54.0	25.0	56.6	47.3
HOUSEHOLD INCOME				
<\$20,000	44.0	20.5	52.1	38.4
\$20,000-34,999	56.4	27.8	51.4	43.0
\$35,000-49,999	49.7	26.0	53.9	44.0
\$50,000-74,999	44.9	23.6	36.0	30.8
> \$75,000	56.0	28.3	52.7	42.9

¹ n=969 adults aged 50 years and older

² Proportion of respondents aged 50 or older who reported ever having had a blood stool test using a home kit.

“A blood stool test is a test that may use a special kit at home to determine whether the stool contains blood. Have you ever had this test using a home kit?”

³ Proportion of respondents aged 50 or older who reported having taken a blood stool test using a home kit within the past year.

⁴ Proportion of respondents aged 50 or older who reported ever having had a sigmoidoscopy or colonoscopy exam.

“A sigmoidoscopy or colonoscopy is when a tube is inserted in the rectum to view the bowel for signs of cancer and other health problems. Have you ever had this exam?”

⁵ Proportion of respondents aged 50 or older who reported having had a sigmoidoscopy or colonoscopy examination within the past five years.

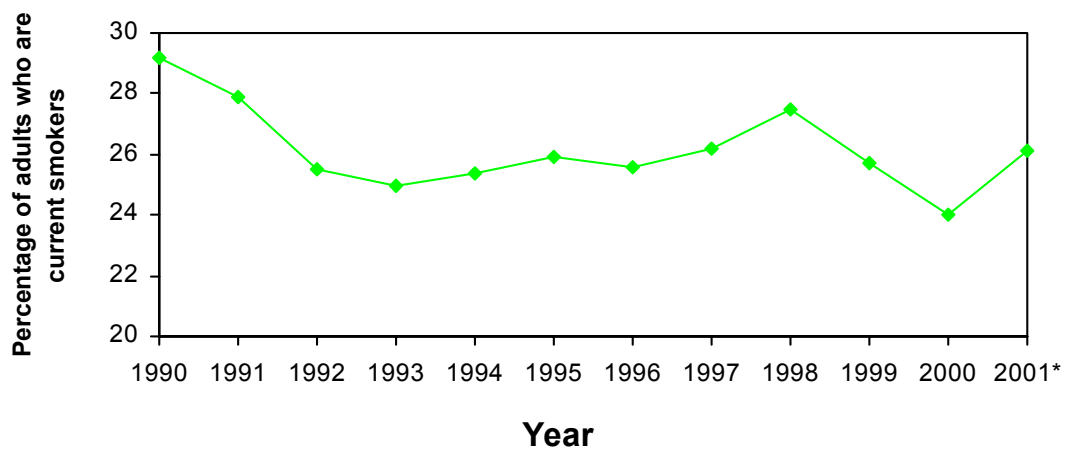
Table 13.

Cigarette Smoking Status Among Michigan Adults, 2000

Demographic Characteristics	Current Smoker ¹ (%)	Former Smoker ² (%)	Never Smoked (%)
TOTAL	24.0	25.0	50.9
AGE			
18-24 Years	28.7	11.4	60.0
25-34 Years	28.9	13.2	57.9
35-44 Years	30.3	20.2	49.5
45-54 Years	24.2	30.9	44.9
55-64 Years	19.7	37.6	42.6
65-74 Years	12.4	43.6	44.0
75+ Years	6.4	35.7	57.9
GENDER			
Male	26.4	26.8	46.9
Female	21.9	23.4	54.6
RACE			
White	22.8	26.7	50.5
Black	30.9	15.2	53.9
EDUCATION			
Less than High School	35.8	27.7	36.6
High School Graduate	30.0	24.5	45.6
Some College	25.3	24.6	50.1
College Graduate	10.8	24.5	64.7
HOUSEHOLD INCOME			
<\$20,000	31.7	21.9	46.4
\$20,000-34,999	27.6	27.1	45.3
\$35,000-49,999	30.0	22.7	47.3
\$50,000-74,999	22.2	23.6	54.2
≥\$75,000	14.2	27.7	58.1
¹ Proportion of respondents who reported that they had ever smoked at least 100 cigarettes in their life and that they smoke cigarettes now. ² Proportion of respondents who reported that they had ever smoked at least 100 cigarettes in their life but that they do not smoke cigarettes now.			

Figure 3.

Comparison Across Survey Years for Current Smokers in Michigan



Year	Current Smoker (%)
1990	28.9
1991	27.9
1992	25.5
1993	25.0
1994	25.4
1995	25.9
1996	25.6
1997	26.2
1998	27.5
1999	25.7
2000	24.0
2001*	26.1

*2001 preliminary estimate

Table 14.

Cigarettes Smoked per Day Among Adult Current Smokers¹ in Michigan, 2000

Demographic Characteristics	1-19 Cigarettes Per Day (%)	20-39 Cigarettes Per Day (%)	40+ Cigarettes Per Day (%)	Mean Number of Cigarettes Per Day
TOTAL	60.6	35.8	3.7	15.1
AGE				
18-34 Years	72.0	27.3	0.7	12.6
35-54 Years	53.6	41.1	5.3	16.7
55+ Years	53.1	40.8	6.1	16.5
GENDER				
Male	58.0	37.1	4.9	16.1
Female	63.4	34.3	2.3	14.0
RACE				
White	55.8	39.8	4.3	16.0
Black	80.9	17.6	1.5	11.6
EDUCATION				
Less than High School	46.9	44.8	8.3	17.8
High School Graduate	61.5	36.4	2.1	14.8
Some College	63.2	33.1	3.7	14.6
College Graduate	69.0	27.7	3.3	14.0
HOUSEHOLD INCOME				
<\$20,000	58.2	37.4	4.4	15.2
\$20,000-34,999	63.0	30.6	6.5	15.2
≥\$35,000	59.1	38.4	2.5	15.3
¹ n=615				

Table 15.

Quitting Behaviors Among Adult Smokers in Michigan, 2000

Demographic Characteristics	Tried to Quit Smoking One Day or Longer in Past Year ¹ (%)	Advised by Doctor About a Stop Smoking Program ² (%)
TOTAL	59.1	52.7
AGE		
18-34 Years	69.5	37.3
35-54 Years	53.2	62.5
55+ Years	53.2	61.5
GENDER		
Male	58.7	44.9
Female	59.5	61.1
RACE		
White	56.6	54.7
Black	73.4	44.3
EDUCATION		
Less than High School	57.6	40.8
High School Graduate	62.1	48.9
Some College	57.5	60.4
College Graduate	57.2	60.1
HOUSEHOLD INCOME		
<\$20,000	60.3	41.3
\$20,000-34,999	61.8	51.9
\$35,000-49,999	53.9	52.7
\$50,000-74,999	63.5	59.1
≥\$75,000	48.0	68.0
¹ Among current daily smokers (n=482).		
² Among all current smokers (n=615).		

Table 16.

Tobacco Use Indicators Among Michigan Youth, 2001

Behavior	MI (%)	Gender		Grades				Race	
		Male (%)	Female (%)	9 (%)	10 (%)	11 (%)	12 (%)	Black (%)	White (%)
Percentage of students who ever tried cigarettes, even 1 or 2 puffs	64	63	64	55	63	66	73	64	63
Percentage of students who smoked a whole cigarette before age 13	23	23	23	27	24	21	19	20	23
Percentage of students who smoked cigarettes on 1 or more of past 30 days	26	24	27	20	23	26	35	12	28
Percentage of students who smoked cigarettes on 20 or more of past 30 days	13	12	13	9	10	14	20	4	14
Percentage of students who smoked 2 or more cigarettes per day on days they smoked during past 30 days	18	17	19	14	15	19	25	7	19
Percentage of students who smoked cigarettes regularly (at least 1 per day for 30 days)	20	19	21	16	17	24	26	9	22
Of students who were current smokers, percentage tried to quit smoking in the past 12 months	64	59	68	67	63	66	62	N/A	65
Percentage of students who smoked cigars, cigarillos, or little cigars on 1 or more of past 30 days	15	21	8	13	14	14	20	15	15
Shaded areas reflect statistically significant ($p < 0.05$) differences between percentages within a category, e.g., gender. N/A indicates less than 100 respondents for the category.									

Table 17.

Home Smoking Rules by Smoking Status Among Michigan Adults, 1995

	Cigarette Smoking Rule in Home		
	Smoking Not Permitted (%)	Permission Varies by Time or Place (%)	Smoking Permitted Without Restrictions (%)
TOTAL	46.9	29.3	23.8
Smoking Status ¹			
Current Smoker	13.4	40.3	46.3
Former Smoker	49.3	29.9	20.8
Never Smoker	65.4	22.8	12.8
¹ This is the smoking status of the respondent and does not indicate the smoking status of others in the household.			

Table 18.

Exposure of Children to ETS in Michigan Households With Children, 1995

	Households That Allow Smoking in House (%)
TOTAL	52.5
EDUCATION	
Less than High School	76.2
High School Graduate	62.0
Some College	52.6
College Graduate	28.8
HOUSEHOLD INCOME	
< \$20,000	71.9
\$20,000-49,000	52.7
>\$50,000	39.3

Table 19.

Prostate Specific Antigen (PSA) Testing Among Michigan Men Aged 50 Years or Older¹, 1999

Demographic Characteristics	Discussed PSA Testing with Doctor ² (%)	Ever Had PSA test ³ (%)
TOTAL	51.5	58.5
AGE		
50-59 Years	47.7	49.1
60-69 Years	65.0	74.8
70+ Years	46.1	61.5
EDUCATION		
Less than High School or High School Graduate	47.2	55.2
Some College or College Graduate	55.1	61.2
HOUSEHOLD INCOME		
<\$35,000	43.8	57.2
>\$35,000	58.8	60.2
¹ n=396 adult males aged 50 years and older who had never been told they had prostate cancer ² A PSA test is a blood test that is used to help detect prostate cancer in men before they show any symptoms. "Have you and your doctor ever discussed the benefits and risks of using the PSA test in this way?" ³ "Have you ever had a PSA test?"		

Table 20.

Digital Rectal Examinations Among Michigan Adults, 1995

Demographic Characteristics	Ever Had Digital Rectal Examination (40+ years) (%)	Had Digital Rectal Examination in Past Year (40+ years) (%)
TOTAL	75.7	45.1
AGE		
40-44 Years	59.6	31.1
45-54 Years	77.5	46.3
55-64 Years	83.5	48.4
65-74 Years	80.4	54.7
75+ Years	75.6	42.1
GENDER		
Male	79.6	45.2
Female	72.4	45.1
RACE		
White	76.9	45.5
Black	69.4	45.1
EDUCATION		
Less than High School	70.4	36.8
High School Graduate	73.6	42.7
Some College	75.3	46.5
College Graduate	82.8	52.4
HOUSEHOLD INCOME		
<\$10,000	63.3	35.5
\$10,000-19,999	75.9	43.4
\$20,000-34,999	74.3	40.2
\$35,000-50,000	70.8	43.3
>\$50,000	84.0	52.6

Table 21.

Estimated Number of Cancer Cases Attributable to Risk Factors by Cancer Site in Michigan, 2002

Cancer Site	Modifiable Risk Factor	Estimated % of Cases Attributable to Risk Factor Based on Brownson Estimates ^a	Estimated Number of New Cancer Cases in Michigan Attributable to Risk Factor, 2002 ^b
Lung	Tobacco	87 (84-90)	5,307 (5,124-5,490)
Lung	Occupational exposures	13 (10-20)	793 (610-1,220)
Lung	Indoor radon	10 (7-25)	610 (427-1,525)
Lung	Diet	5	305
Lung	Environmental tobacco smoke	2 (1-6)	122 (61-366)
Colorectal	High fat diet	15-25	795-1,325
Colorectal	Low fruits and vegetables diet	25-35	1,325-1,855
Colorectal	Physical inactivity	32	1,696
Breast	Obesity after menopause	12 (8-16)	876 (584-1,168)
Cervical	Multiple sexual partners	38 (25-50)	152 (100-200)
Cervical	Cigarette smoking	32 (23-41)	128 (92-164)
Cervical	Early age at first intercourse (<17)	25 (17-33)	100 (68-132)
Cervical	History of sexually transmitted diseases	5 (1-50)	20 (4-200)
^a Brownson RC, Reif JS, et al. Cancer. In Chronic Disease Epidemiology and Control, second edition, APHA ISBN 0-87553-237-3. ^b American Cancer Society, Cancer Facts & Figures 2002, Atlanta, GA, 2002.			

Human Cost

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Human Cost

Mortality and survival rates give a partial picture of the burden of cancer deaths in a population. Years of life lost (YLL) due to premature death from cancer were calculated to provide an additional dimension to the description of the burden of disease.¹ Person-years of life lost (PYLL) were calculated for this report as follows: For each of the individuals who died of a particular cancer, it was possible to obtain the number of additional years they were expected to live, based on their gender and race, had they not died of cancer and conditional on their surviving to the age at which they died of cancer. Life expectancy data were obtained from the National Center for Health Statistics (NCHS).² One-year intervals were used in the calculations.³ The number of deaths at each age was multiplied by the average years of life remaining for a person of that sex, race and age to estimate the number of years of life lost for all people of that age dying of the particular cancer.⁴ These years of life lost were summed across ages for each of the sites to get the estimate of PYLL.¹

Also presented is the average years of life lost (AYLL), calculated by dividing the PYLL by the total number of deaths.¹ Average years of life lost are compared between blacks and whites for each cancer site, and SEER estimates of AYLL for the United States are compared to estimates of Michigan's AYLL.

Summary

Figure 1 shows the total number of person-years of life lost by cancer site in Michigan in 2000. The greatest number of person-years of life lost was due to lung cancer deaths; the total number of person-years lost was 85,766. Breast cancer was responsible for the next greatest number of person-years of life to be lost, costing 28,380 total person-years. This was followed by colorectal cancer, which caused 27,056 person-years of life lost. Prostate cancer cost 9,759 total years of life, and cervical cancer was responsible for 3,105 years of life lost. Figure 2 traces the total number of person-years of life lost by cancer site over time from 1985 to 2000.

1 Ries LAG, Eisner MP, Kosary CL, Hankey BF, Miller BA, Clegg L, Edwards BK (eds). SEER Cancer Statistics Review, 1973-1999, National Cancer Institute. Bethesda, MD, 2000. http://seer.cancer.gov/csr/1973_1999/, 2002. A continuing program of the National Cancer Institute (NCI), the SEER program collects data on a routine basis from designated population-based cancer registries in various areas of the country. SEER calculates national AYLL based on data from twelve areas (five states—Connecticut, Hawaii, Iowa, New Mexico, and Utah, six metropolitan areas—Detroit, Atlanta, San Francisco-Oakland, Seattle-Puget Sound, Los Angeles, and San Jose-Monterey, and the Alaska Native Registry). These twelve geographic areas represent an estimated 14% of the US population. SEER AYLL estimates for 1999 are produced using United States Life Tables, 1999; National Vital Statistics Reports from the Centers for Disease Control and Prevention.

2 United States Life Tables, 1985-1999; National Vital Statistics Reports from the Centers for Disease Control and Prevention.

3 The Life Tables for years 1997-1999 show expected years of life remaining for ages zero to 100, but Life Tables for years 1985-1996 show expected years of life remaining only for ages zero to 85. In order to calculate years of life lost for people dying of cancer after age 86 in years prior to 1997, the years remaining in the 1997 Life Table for ages 86 to 100 years were used to fill in these values for the 1985-1996 calculations. Because the 1999 Life Tables are the most recent year available, they were used in calculating the person-years of life lost in 2000.

4 Michigan Resident Death Files, Michigan Department of Community Health (MDCH), Division for Vital Records and Health Statistics.

Looking at the total person-years of life lost is one measure of the impact of various cancers on the population as a whole. Alternatively, the average years of life lost per death due to cancers at each of the selected sites reveals an aspect of the burden of cancer on individuals. Figure 3 shows the average years of life lost by cancer site over time from 1985 to 2000. In Figure 4, average years of life lost by Michigan residents in 2000 by cancer site are shown next to the average years of life lost nationally in 1999. Although cervical cancer caused the fewest person-years of life to be lost in the total population, of the five sites it caused the greatest number of person-years to be lost per death in Michigan, averaging 23.9 years per person. There was a small total number of cervical cancer deaths relative to deaths due to cancer at one of the other four sites presented in this report, so the total sum of person-years of life lost from all of the deaths is small despite the comparatively large number of person-years of life lost with each individual death. Breast cancer had the next highest average cost in years of life lost of the five sites, causing an average loss of 19.0 years per death. Person-years lost due to lung cancer averaged 15.5 per death, and those dying of colorectal cancer lost an average of 13.8 years of life. Prostate cancer deaths caused an average of 8.8 years per person dying to be lost.

The estimated average number of person-years of life lost due to cancers at the five selected sites were similar for Michigan in 2000 and the SEER estimates for 1999. On average, fewer person-years were lost due to cervical and prostate cancer in Michigan than in the United States overall. Estimates of average person-years of life lost due to breast, colorectal and lung cancer were higher for Michigan than the United States averages.

In Figure 5, average person-years of life lost due to cancer at each of the five sites is shown by race. Averaging years of life lost per death, blacks dying of breast cancer lost more years than whites (21.4 and 18.2 years per person). Blacks also lost more years of life than whites who died of colorectal cancer (14.7 and 13.3 years per person), lung cancer (15.9 and 15.3 years per person), and prostate cancer (9.6 and 8.4 years per person). Whites lost more years due to cervical cancer deaths than blacks (24.1 and 21.5 years per person dying, respectively).

Other than years of life lost, estimates of the human costs of cancer are scant. Morbidity indicators for the cancer patient such as losses of work or school time, and periods of restricted activity due to the disease are difficult to measure. In addition, there are significant human and financial costs to family members and other care givers who give up activities, opportunities, and income to provide assistance to cancer patients. To date, no such data have been identified for the cancers of interest here.

Figure 1.

Total Person-Years of Life Lost due to Cancer by Cancer Site, Michigan 2000

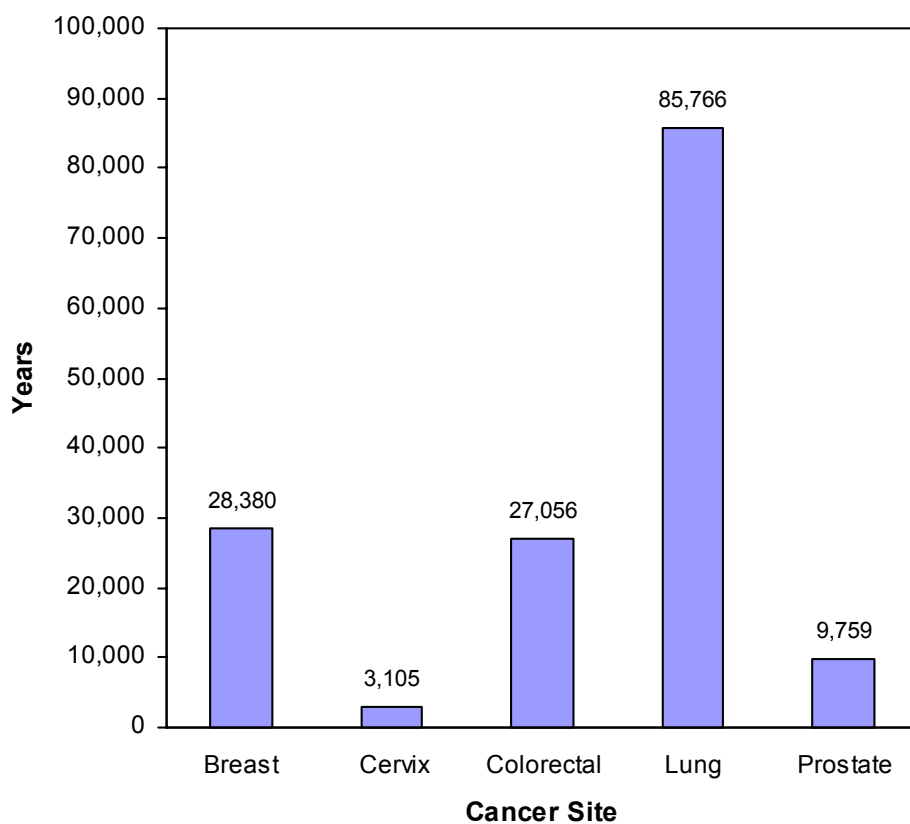


Figure 2.

Total Person-Years of Life Lost due to Cancer, Michigan 1985-2000

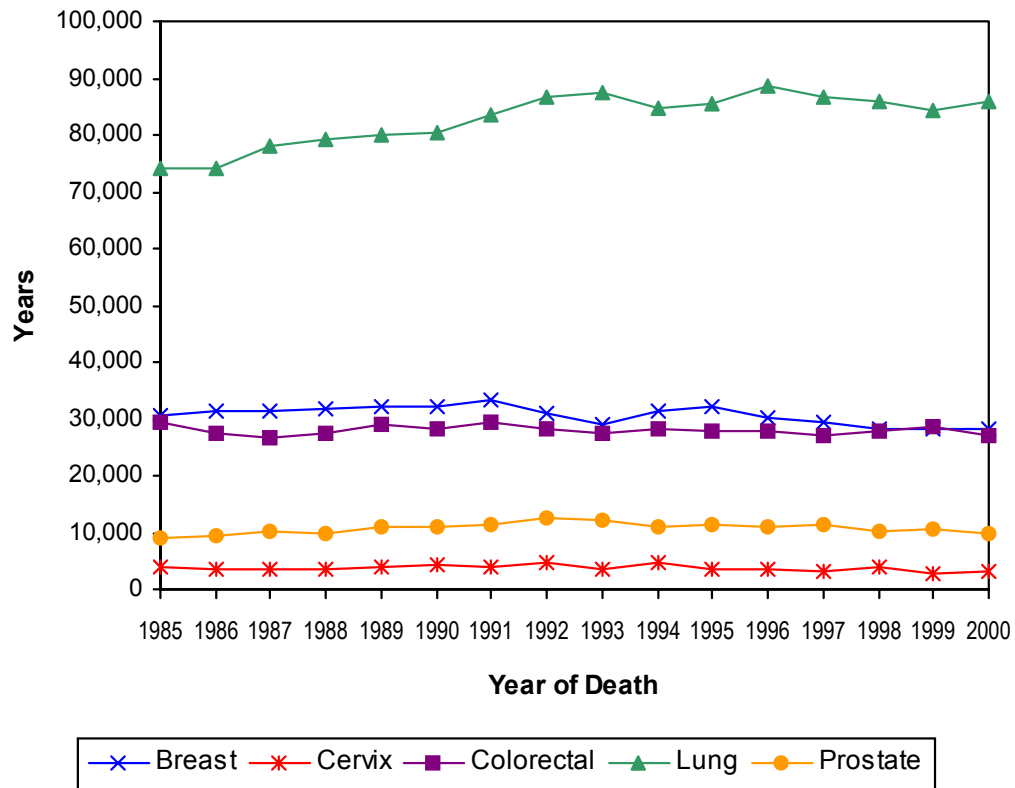


Figure 3.

Average Person-Years of Life Lost due to Cancer, Michigan 1985-2000

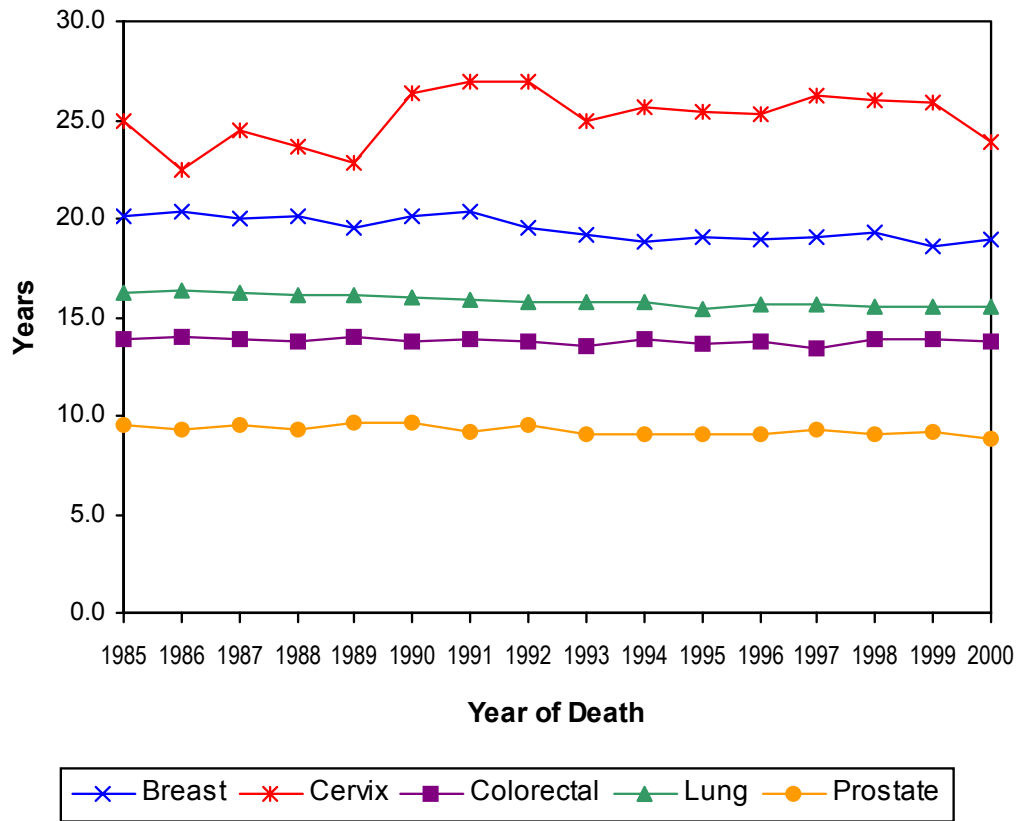
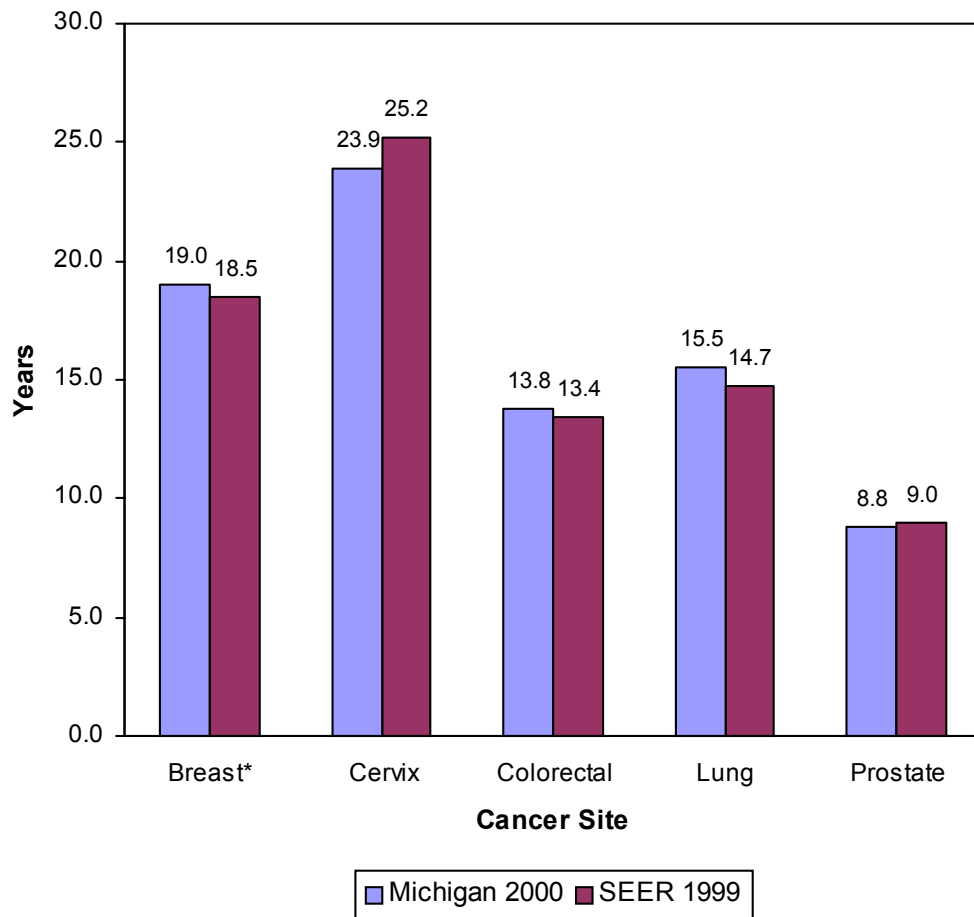


Figure 4.

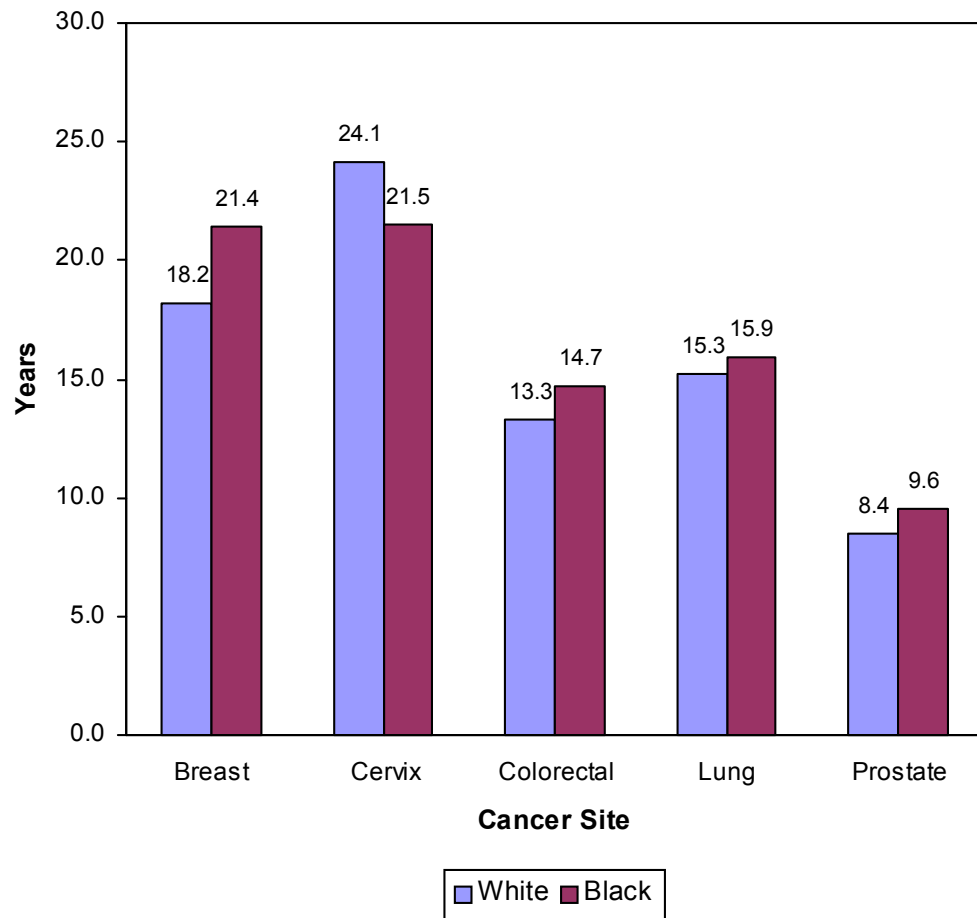
Average Person-Years of Life Lost by Cancer Site Michigan 2000 and SEER 1998



* SEER estimate of average years of life lost due to breast cancer includes both male and female deaths.

Figure 5.

Average Person-Years of Life Lost by Cancer Site and Race, Michigan 2000



Financial Cost

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Financial Cost

This report reflects a portion of the total expenditures used to treat and care for patients suffering from five selected cancers in Michigan. The financial data represent the paid claims during a given year for all patients with the cancers of interest, at various stages in the course of their disease. Out-of-pocket costs borne by these patients and their families for deductibles, medications, home health care assistance and other expenses are not included in this document.

Medical care costs are presented for each selected cancer site: breast, cervical, colorectal, lung and prostate. Cost data associated with claims paid for self-insured and fee-for-service plans for the years 1996-1999 were made available from Blue Cross Blue Shield of Michigan (BCBSM).¹ Cost data associated with claims for the managed care plan, Blue Care Network, for 1999, was also made available from BCBSM. Payment data for Medicare Part A and Medicare Part B were obtained from the Michigan Peer Review Organization and the Wisconsin Physician Service respectively.²

The value of a dollar changes from year to year. In order to compare values across years, the Medical Care component of the Consumer Price Index was used.³ Based on the average value of 1982-84 as 100, the relative annual value for each year was used to adjust dollars to the 1996-year.

Selected cancer hospitalization data were received from the statewide hospital discharge database at the Michigan Department of Community Health.⁴ Hospital admissions data for BCBSM patients were also received from Blue Cross Blue Shield of Michigan. In-situ cases are included in the BCBSM, Medicare, and hospitalization datasets. Analyses of hospital admissions, number and rates of days of care, average length of hospital stays, and number and rates of hospital discharges are reported for the years 1991-1999.

Summary

BCBSM plans paid claims totaling \$160 million for the five cancer sites in Michigan during 1999. Of this amount, \$52 million was paid in hospital billings for both outpatient and inpatient charges; \$56 million were paid for professional service billings. Total BCBSM hospital admissions for the selected cancer sites during 1999 were 7,700, 2% less than 1998 levels.

1 Blue Cross Blue Shield of Michigan, Center for Healthcare Quality; and Blue Care Network of Michigan.

2 Wisconsin Physician Service, Medicare Central Data Unit.

3 Statistical Abstract of the United States 1998: The National Data Book. U.S. Department of Commerce, October 1998.

4 Michigan Resident Hospitalizations Files, Michigan Department of Community Health (MDCH), Division for Vital Records and Health Statistics.

Outpatient charges in the BCBSM managed care plan ranged from 28% to 184% higher than outpatient charges in the BCBSM fee-for-service and self-insured plans in 1999. Conversely, the range of managed care inpatient charges was 7% to 35% lower than fee-for-service and self-insured inpatient charges during that year.

Breast, cervical, colorectal, lung, and prostate cancers claimed \$88 million of Michigan Medicare Part A payments in 1999, 10% less than 1998 Medicare Part A payments for the five cancer sites.

Hospital average length of stay for all five cancer sites gradually trended downward in Michigan throughout the 1990s. However, colorectal cancer patients, followed closely by lung cancer patients, were attributed with the highest average length of hospital stay from 1991 through 1999.

Breast Cancer

Breast cancer accounted for the highest level of BCBSM outpatient and professional service charges among the five cancers. During 1999, BCBSM paid breast cancer outpatient and professional service claims of \$26 million and \$24 million, respectively. In that year BCBSM breast cancer hospital admissions were also at their lowest level for the 4-year period 1996–1999.

Medicare inpatient costs associated with breast cancer maintained a downward trend for the years 1997 through 1999. Per case average Medicare Part A payments fell 4% in each of the years 1997 and 1998, and decreased an additional 6% in 1999. Medicare Part A number of hospital days of care fell 2%, 13%, and 9% during 1997, 1998, and 1999 respectively. The average length of hospital stay also dropped 13%, 8%, and 5% during these years.

Cervical Cancer

During 1999, the number of hospital admissions, average length of hospital stay, and number of days of hospital care for cervical cancer reported by BCBSM fee-for-service and self-insured plans decreased by 24%, 20%, and 39% respectively from the previous year. The cost of BCBSM inpatient cervical cancer claims for the two plan types decreased 18% in 1999.

The Medicare inpatient cost of cervical cancer increased in 1999. Medicare Part A average length of hospital stay and number of days of hospital care reported increases of 13% and 34%, respectively. The associated cost of Medicare Part A cervical cancer hospitalizations during 1999, reported as per case average payments, increased 10%.

Colorectal Cancer

BCBSM fee-for-service and self-insured plans reported number of hospital admissions, average length of hospital stay, and number of days of hospital care for colorectal cancer decreased in 1999 by 25%, 8%, and 31%, respectively from the previous year. The total cost of BCBSM inpatient colorectal cancer claims for the two plan types decreased 30% in 1999, while the per case average cost fell 10% in that year.

Medicare Part A average length of hospital stay and number of days of hospital care attributable to colorectal cancer patients declined 1% and 7% respectively during 1999. While nearly 48% of Michigan Medicare Part A charges associated with all five cancer sites were incurred by colorectal cancer patients in 1999, total payments and per case average payments decreased 10% and 3%, respectively from 1998 levels.

Lung Cancer

Among the five selected cancer sites, lung cancer accounted for the highest percentage (37%) of BCBSM inpatient charges during 1999 with payments in excess of \$19 million. In that year the number of hospital admissions associated with lung cancer among BCBSM fee-for-service and self-insured plans decreased 20%. However, the average length of hospital stay for these patients increased 8%.

Medicare Part A average length of hospital stay and number of days of hospital care attributable to lung cancer patients, declined 4% and 9% respectively during 1999. The associated total cost of 1999 Medicare inpatient services decreased 13% and per case average payments decreased 8%.

Prostate Cancer

During 1999, the number of hospital admissions, average length of hospital stay, and number of days of hospital care for prostate cancer patients enrolled in BCBSM fee-for-service and self-insured plans decreased by 5%, 11%, and 15% respectively from the previous year. The total cost of BCBSM inpatient prostate cancer claims for the two plan types decreased 11% in 1999, and the per case average cost fell 7% in that year.

Prostate cancer costs claimed over 43% of Michigan Medicare Part B payments during 1999. Medicare Part A average length of hospital stay and number of days of hospital care attributable to prostate cancer patients each declined 4% during 1999. The associated total cost of 1999 Medicare inpatient services decreased 2% while per case average payments decreased 3%.

Figure 1.

**Percent of Total BCBSM Inpatient Payments
Made for the Selected Cancer Sites by Cancer Site,
Michigan 1999**

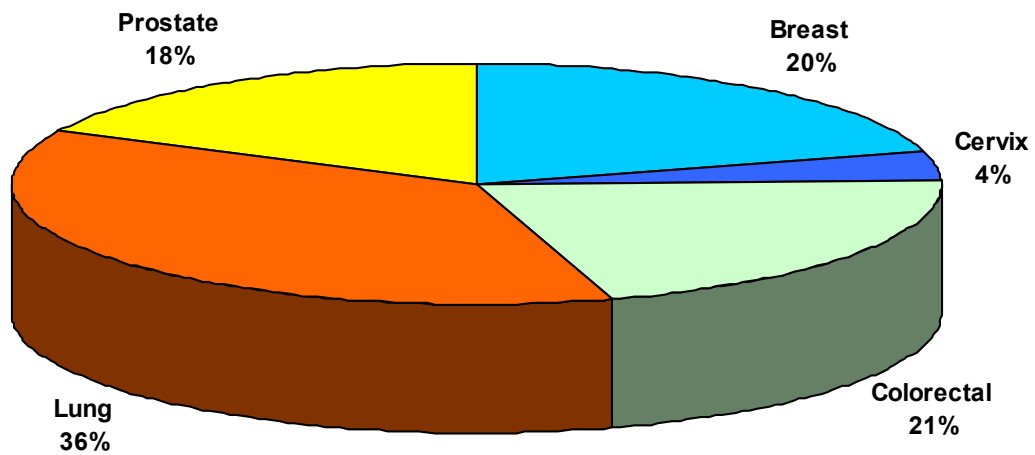


Figure 2.

Percent of Total Medicare Part A Payments
Made for the Selected Cancer Sites by Cancer Site,
Michigan 1999

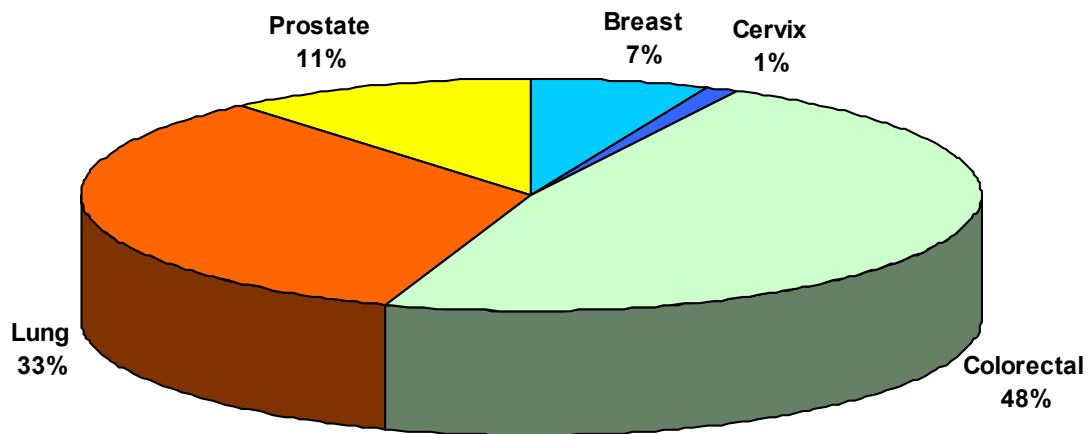


Figure 3.

**Percent of Total Medicare Part B Payments
Made for the Selected Cancer Sites by Cancer Site,
Michigan 1999**

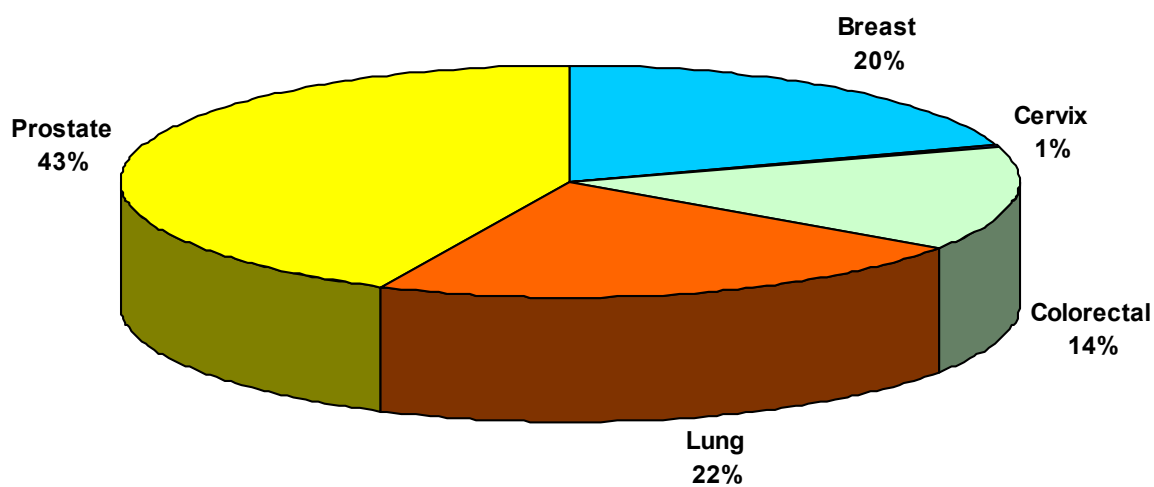


Figure 4.

Hospital Average Length of Stay by Cancer Site, Michigan 1991–1999

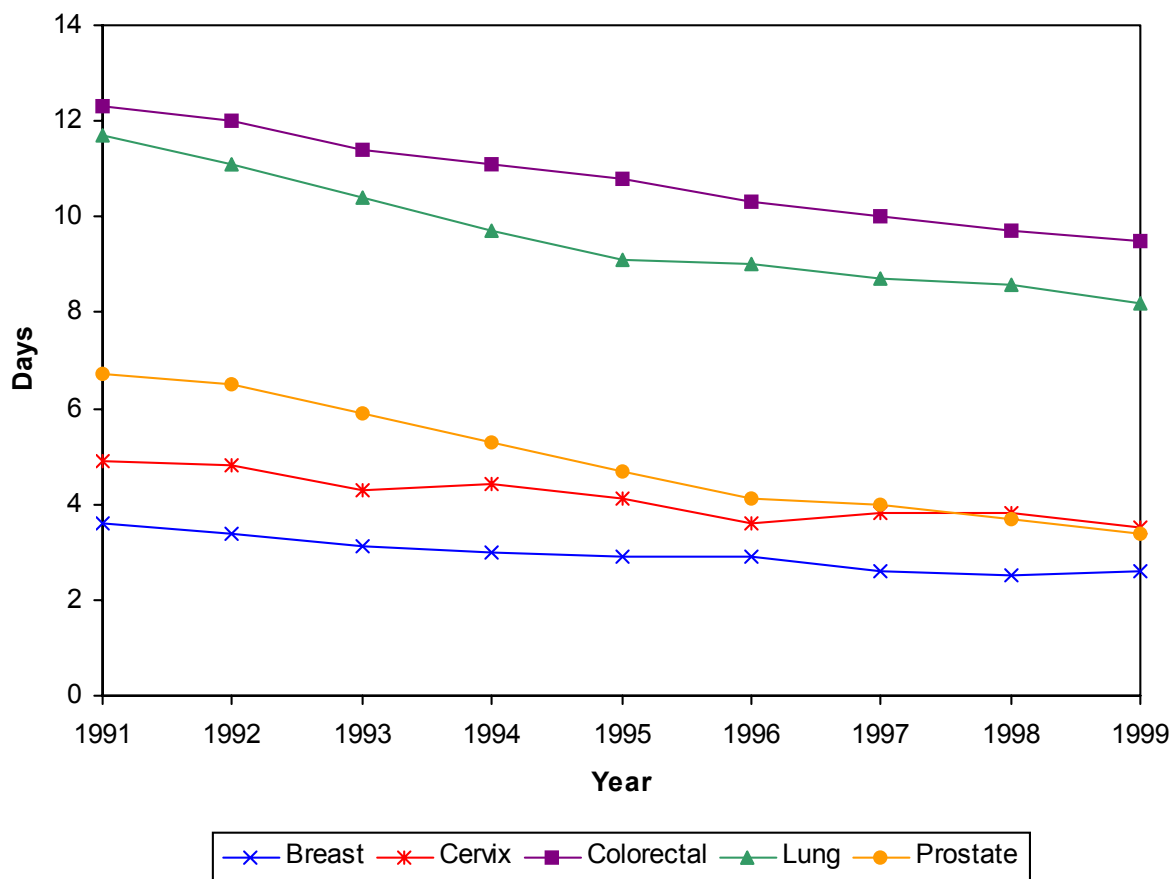


Figure 5.

Total Hospital Days of Care by Cancer Site, Michigan 1991–1999

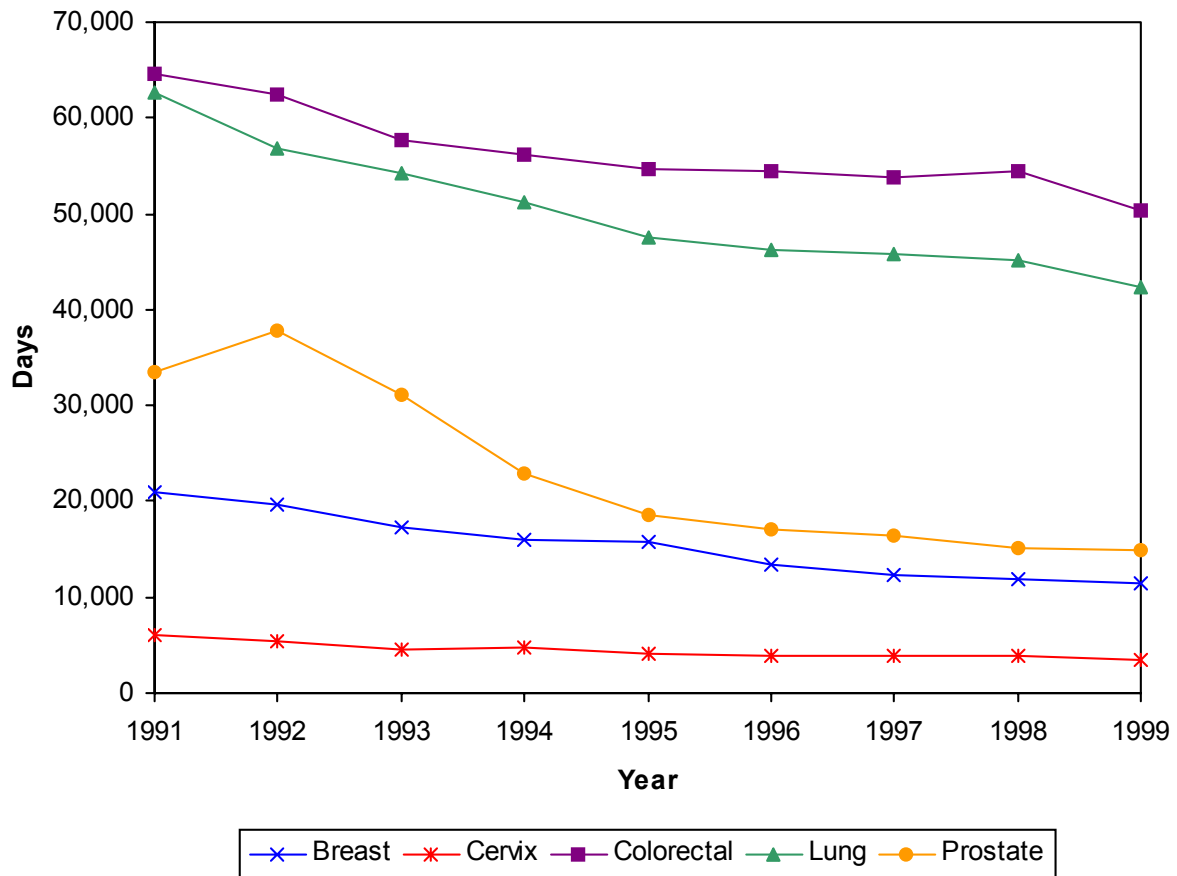
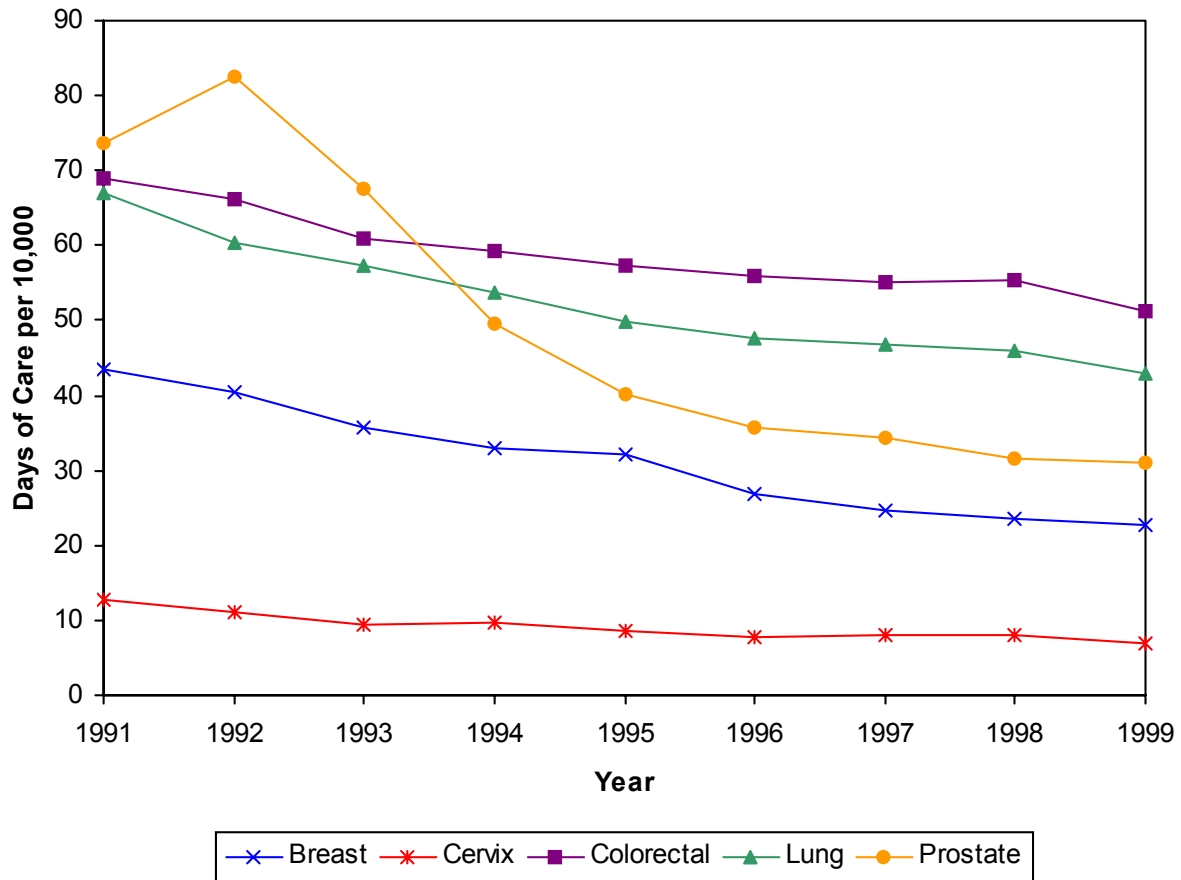


Figure 6.

Rates* of Hospital Days of Care by Cancer Site, Michigan 1991–1999



*Rates per 10,000 Michigan population.

Figure 7.

Total Hospital Discharges by Cancer Site, Michigan 1991–1999

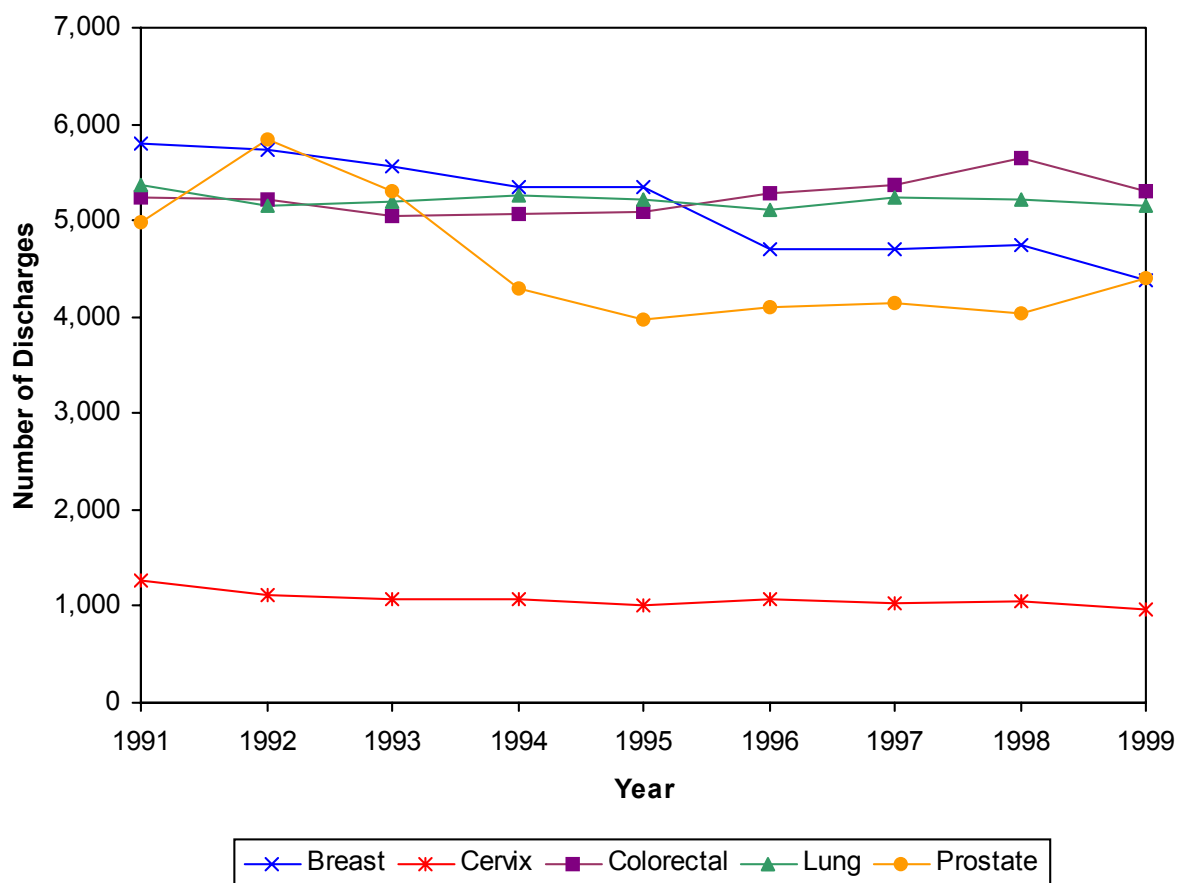
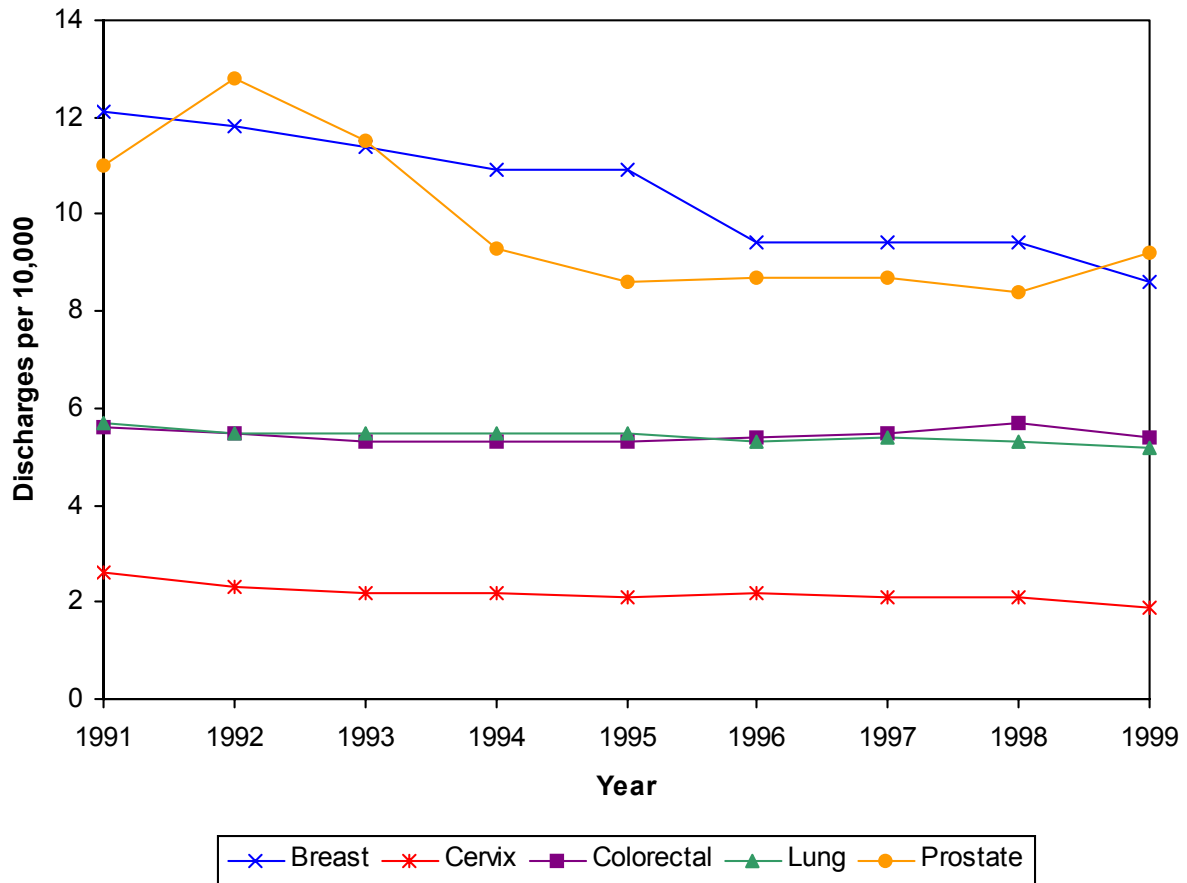


Figure 8.

Rates of Hospital Discharge by Cancer Site, Michigan 1991–1999



*Rates per 10,000 Michigan population.

Figure 9.

Hospital Discharges by Cancer Site, Michigan 1999

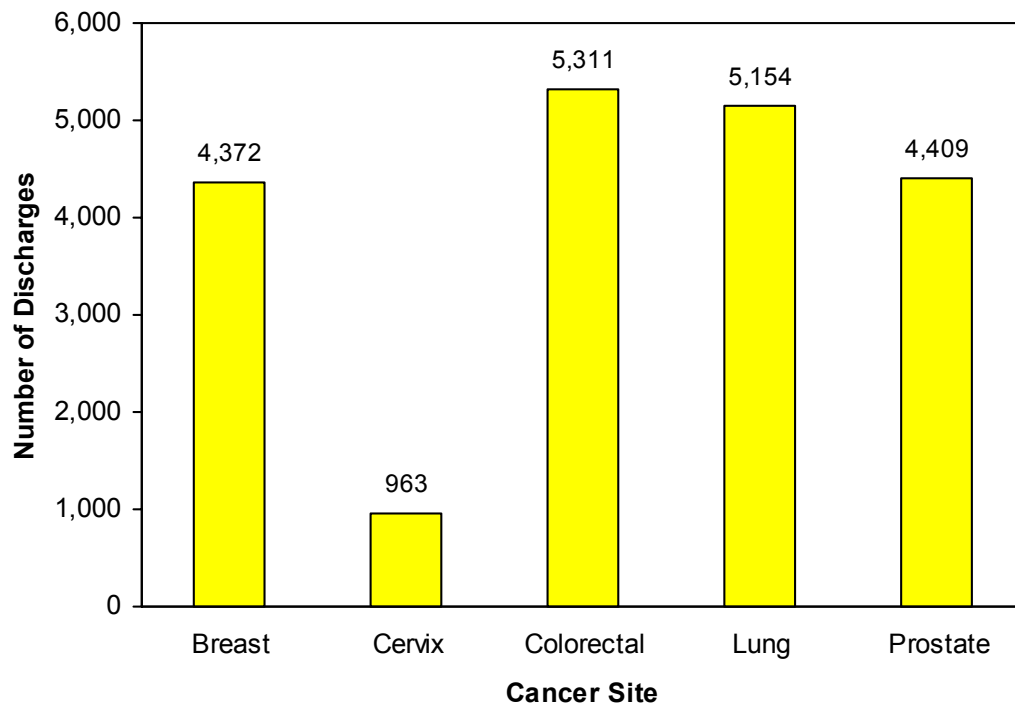
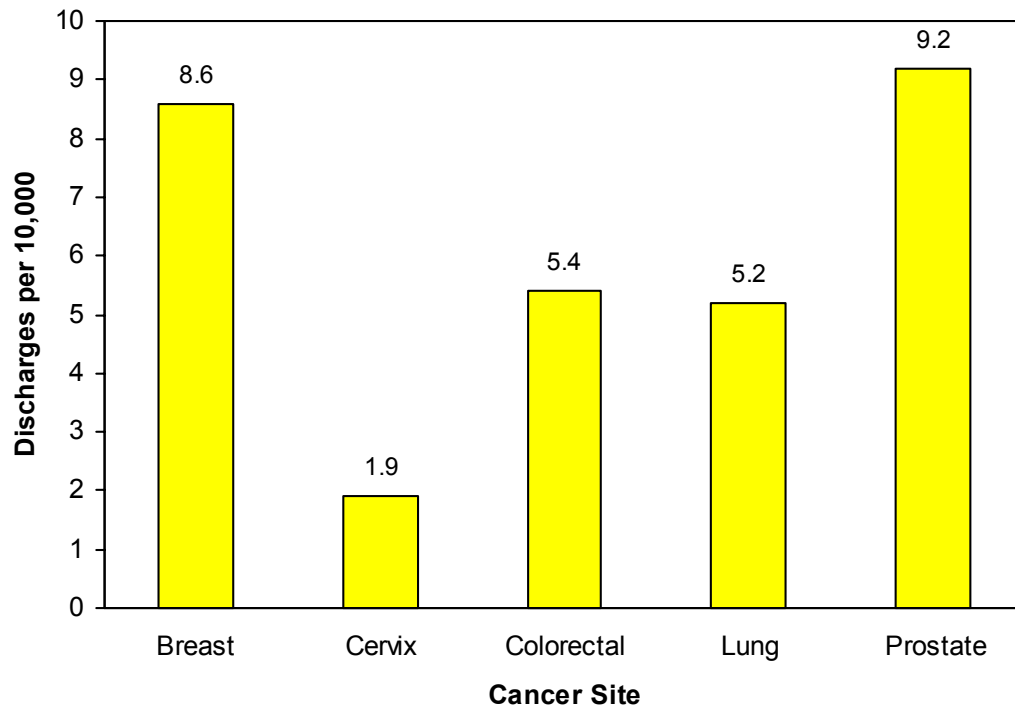


Figure 10.

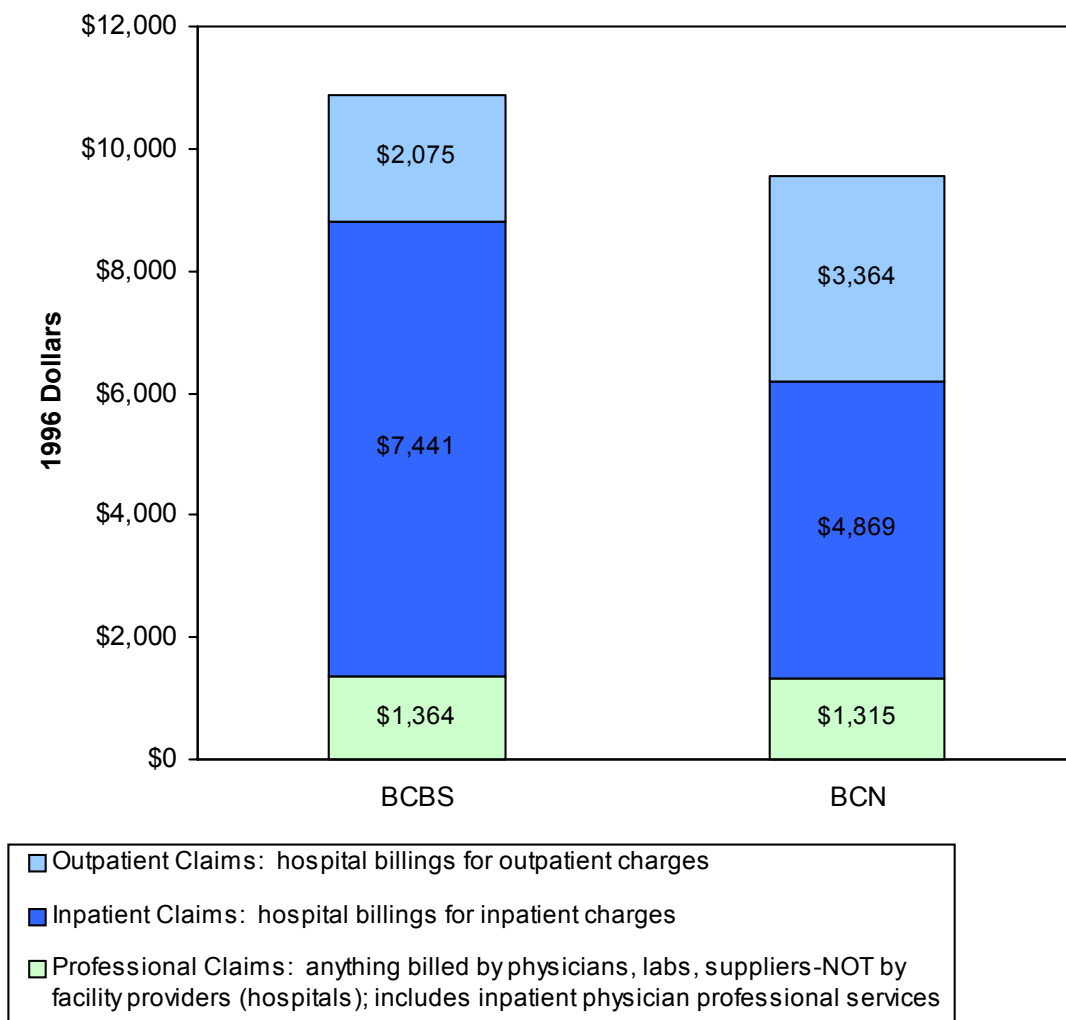
Rates* of Hospital Discharge by Cancer Site, Michigan 1999



*Rates per 10,000 Michigan population.

Figure 11.

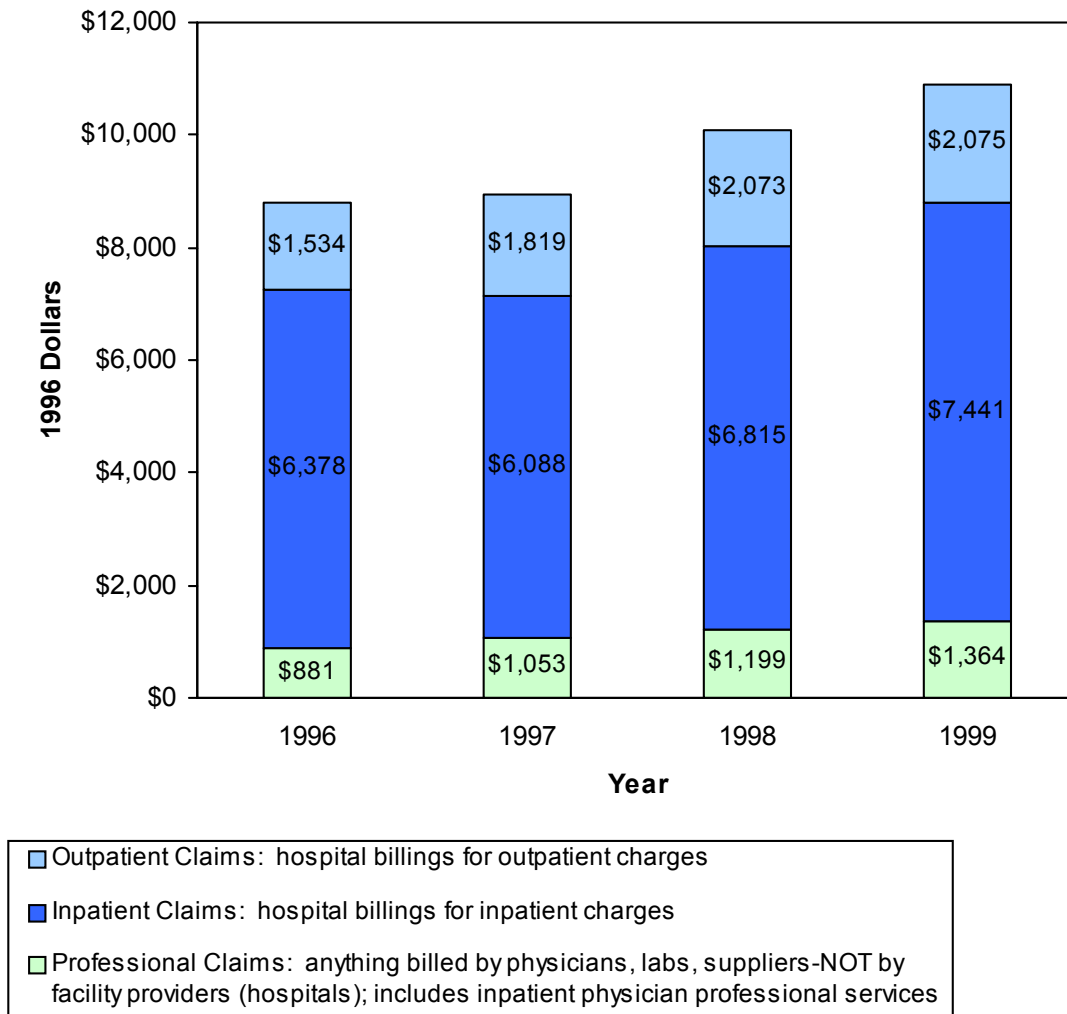
Breast Cancer 1999 Per Case Average BCBSM Payments by Type of Claim



BCBS: fee-for-service and self-insured plans
BCN: managed care plan

Figure 12.

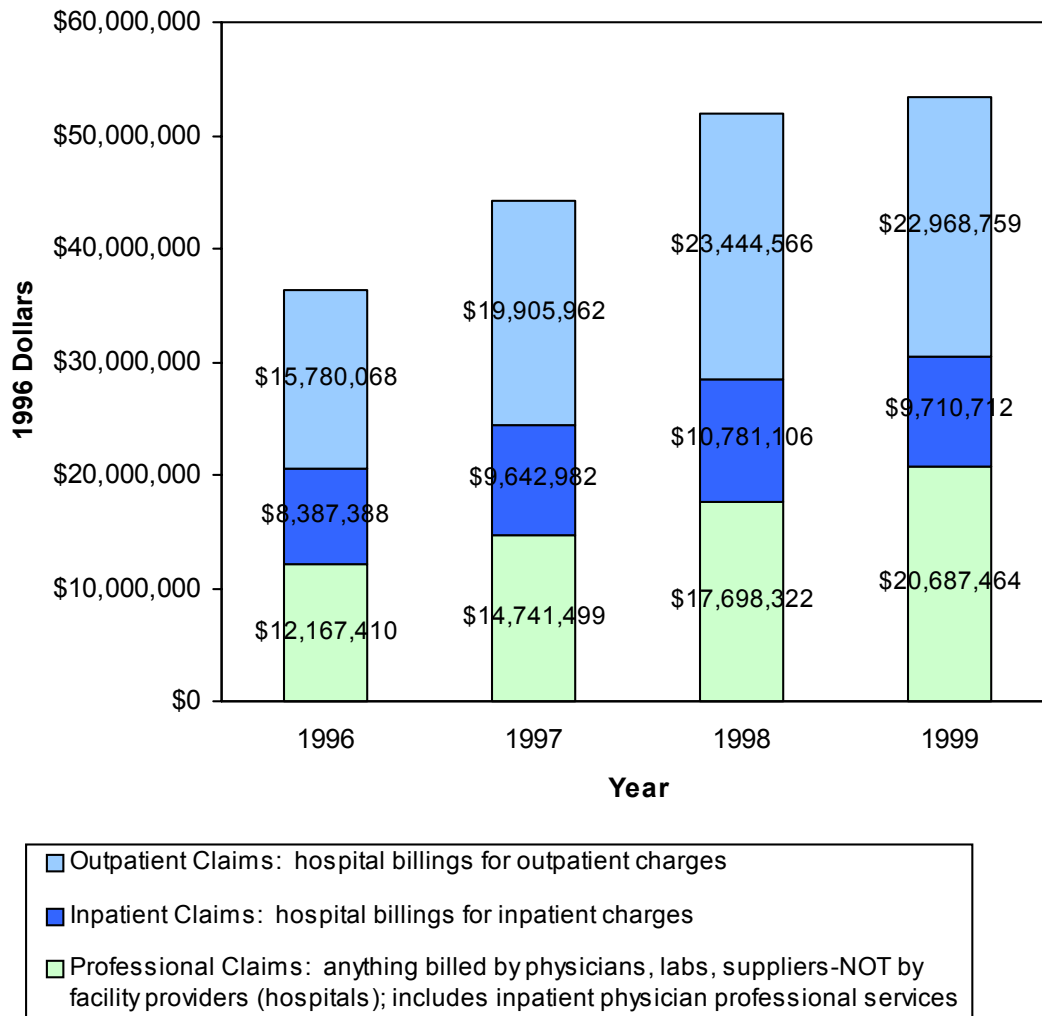
Breast Cancer Per Case Average BCBSM* Payments by Type of Claim, 1996–1999



*Excludes managed care plan.

Figure 13.

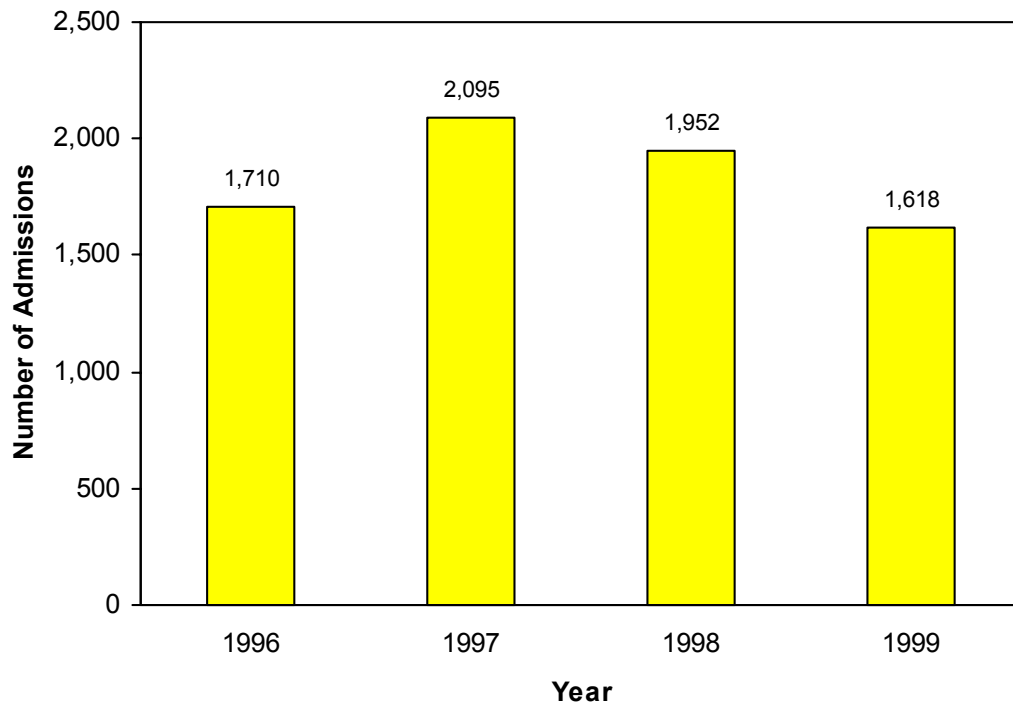
Breast Cancer Total BCBSM* Payments by Type of Claim, 1996–1999



*Excludes managed care plan.

Figure 14.

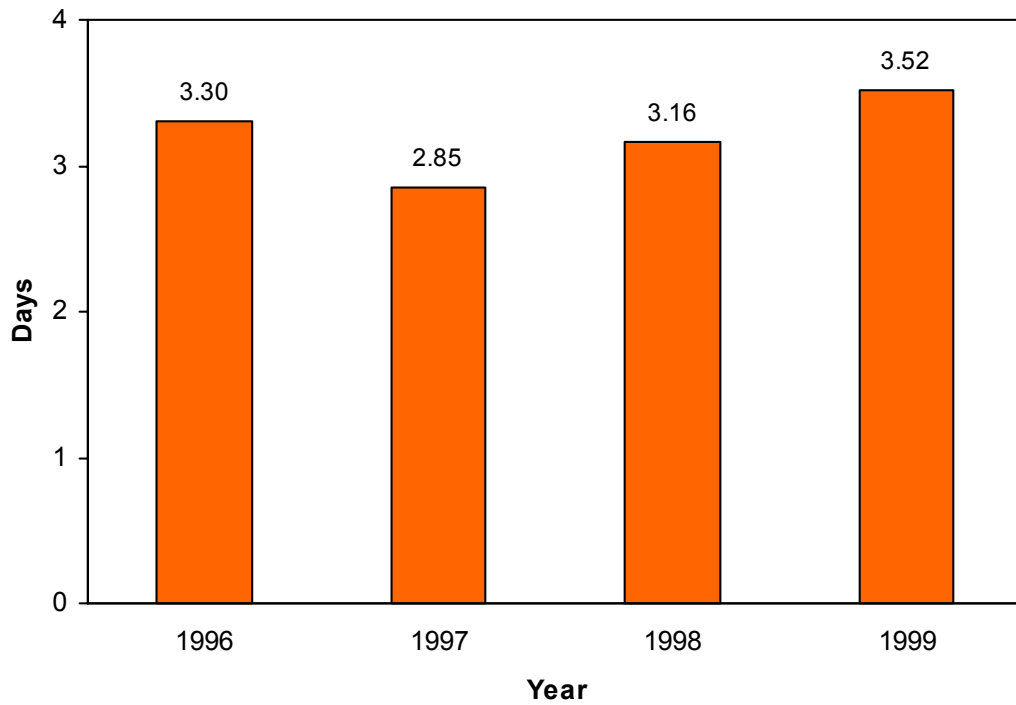
**Breast Cancer
Number of Hospital Admissions for BCBSM*
Inpatient Coverage Recipients,
1996–1999**



*Excludes managed care plan.

Figure 15.

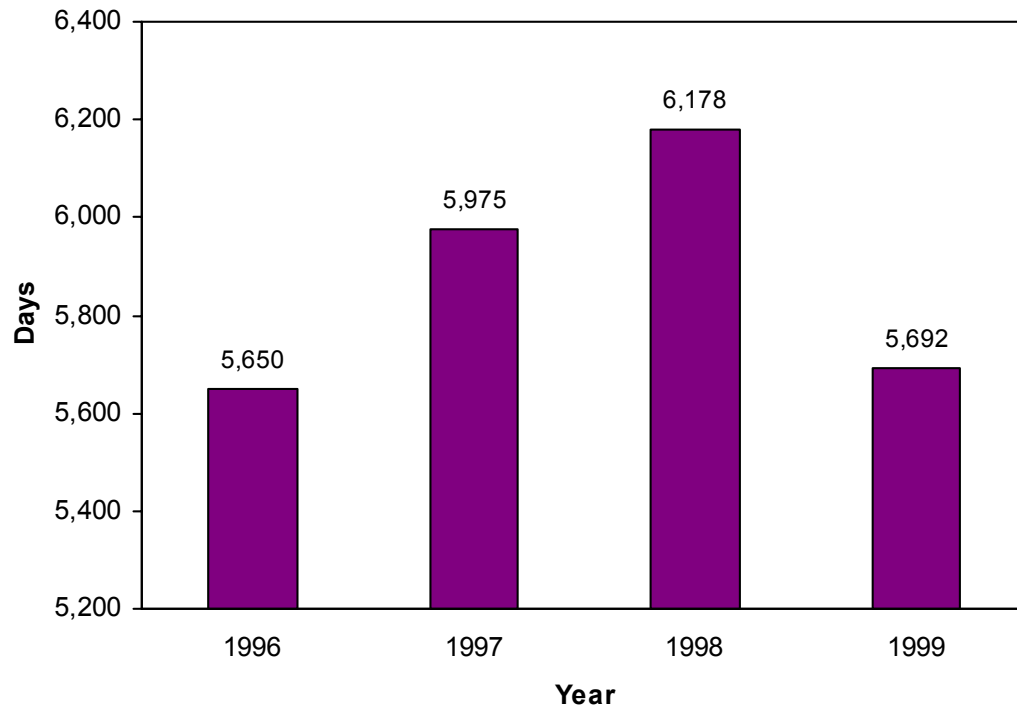
**Breast Cancer
Hospital Average Length of Stay for BCBSM*
Inpatient Coverage Recipients,
1996–1999**



*Excludes managed care plan.

Figure 16.

**Breast Cancer
Total Hospital Days of Care for BCBSM*
Inpatient Coverage Recipients,
1996–1999**



*Excludes managed care plan.

Figure 17.

Breast Cancer
Per Case Average
Medicare Part A Payments,
1996–1999

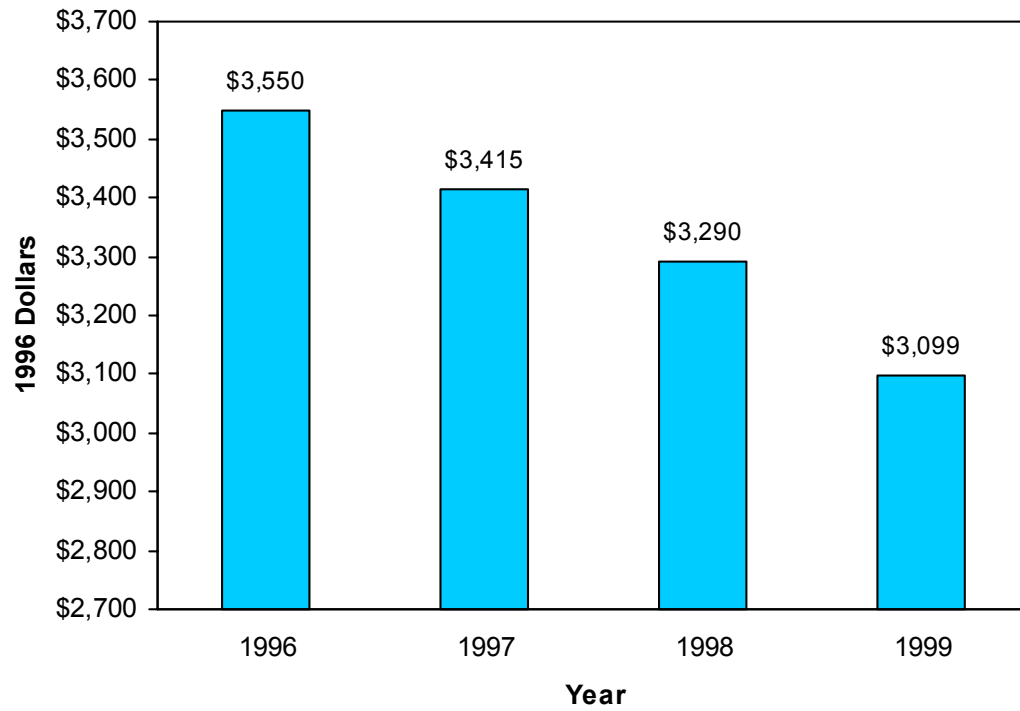


Figure 18.

Breast Cancer Total Medicare Part A Payments, 1996–1999

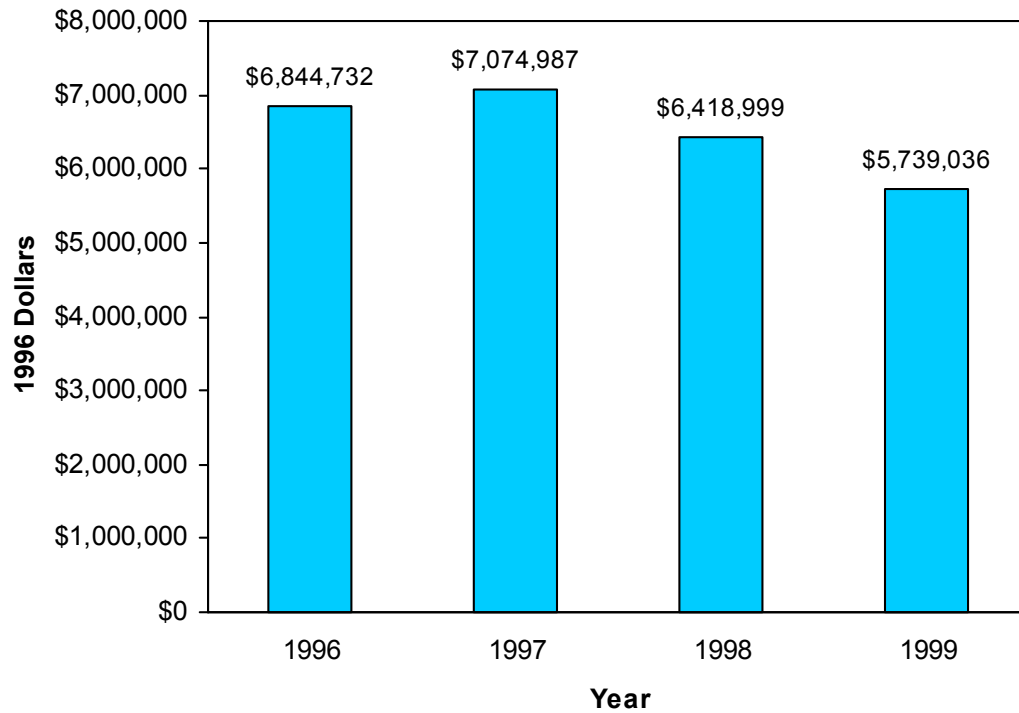


Figure 19.

**Breast Cancer
Hospital Average Length of Stay for
Medicare Part A Recipients,
1996–1999**

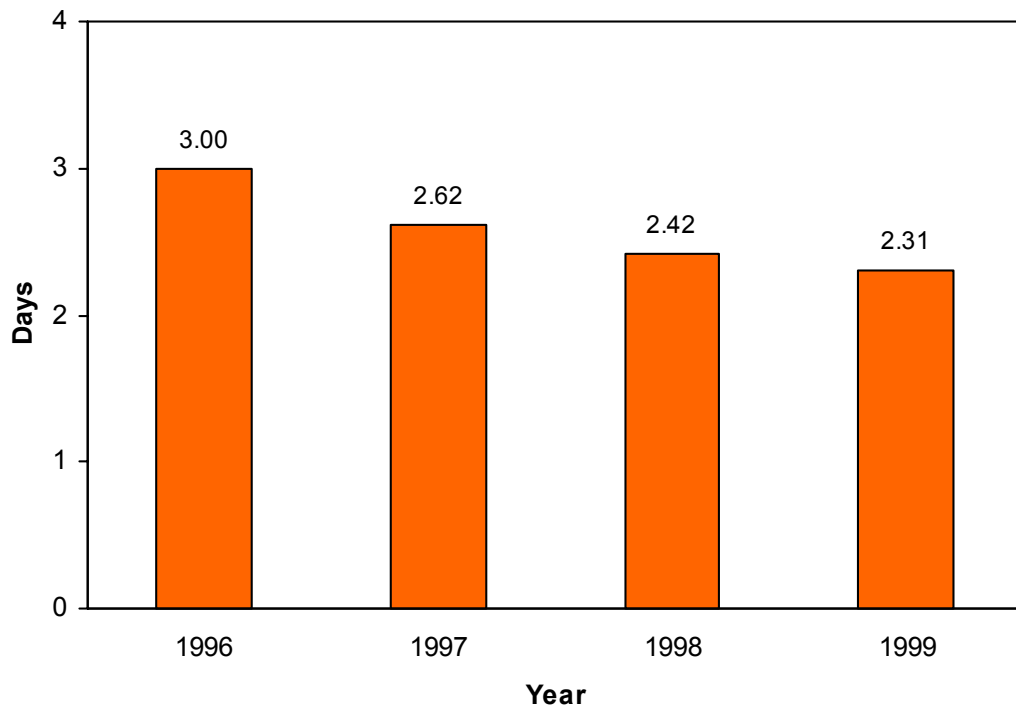


Figure 20.

Breast Cancer
Hospital Days of Care for
Medicare Part A Recipients,
1996–1999

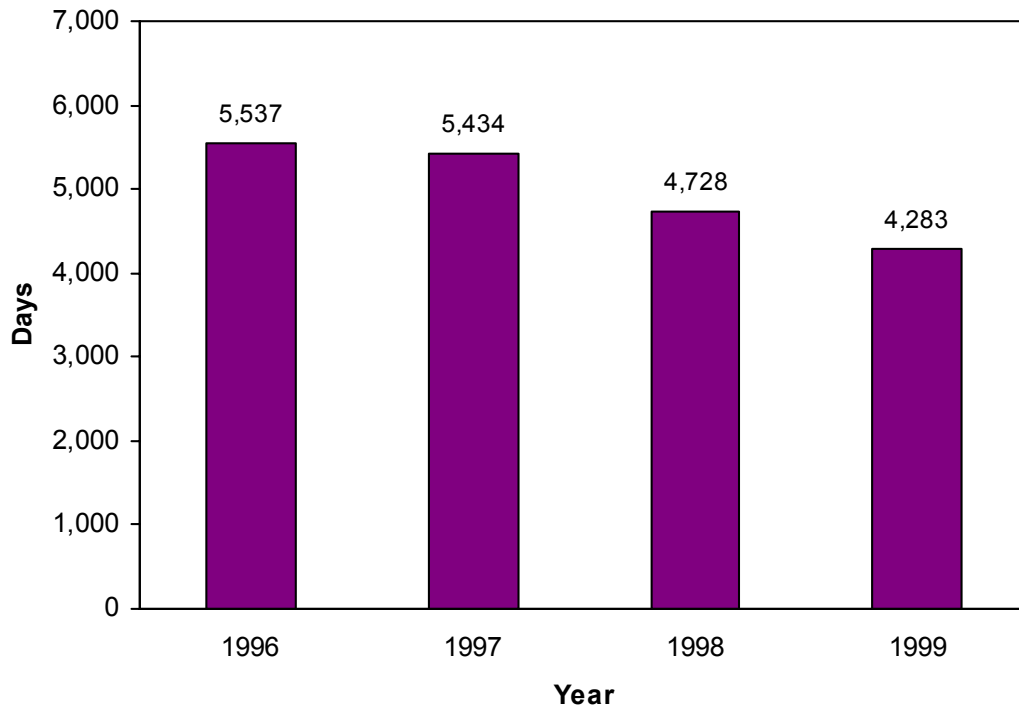
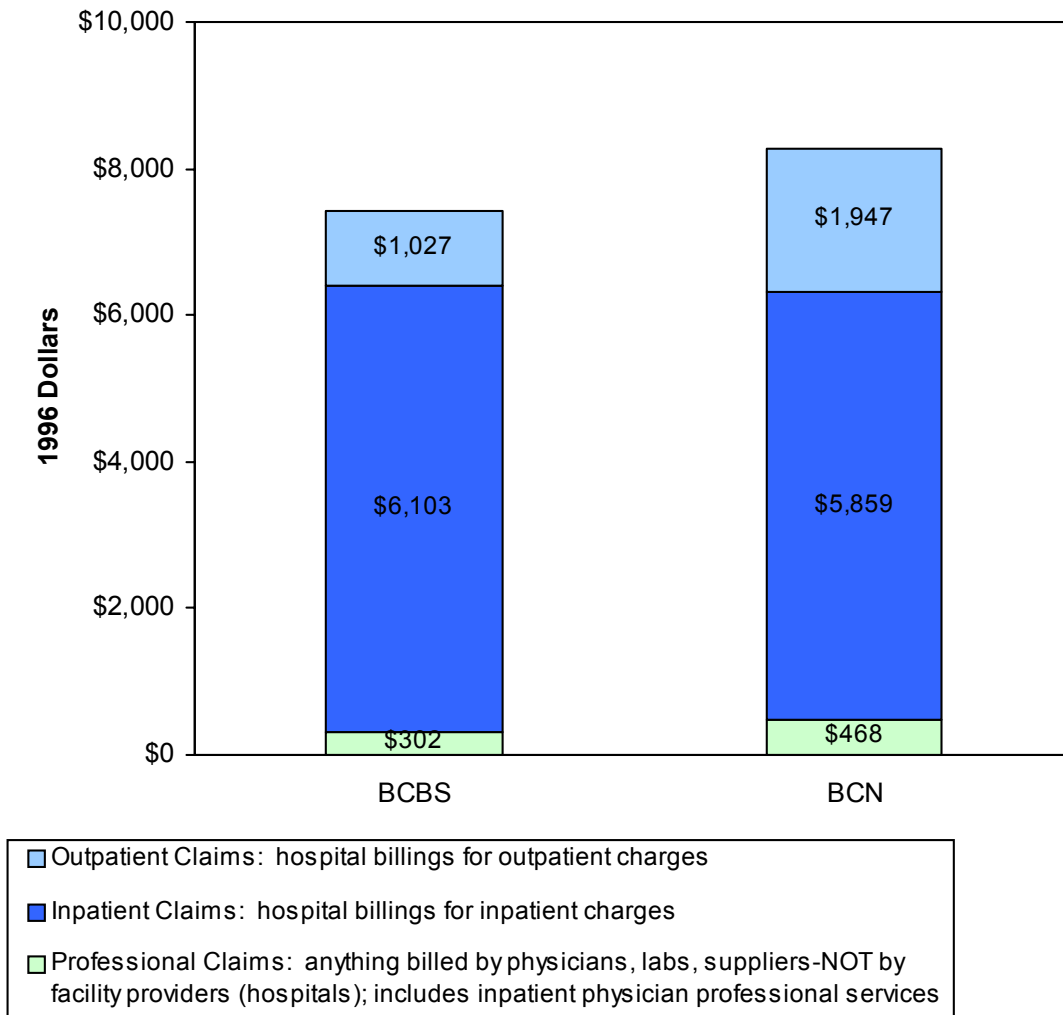


Figure 21.

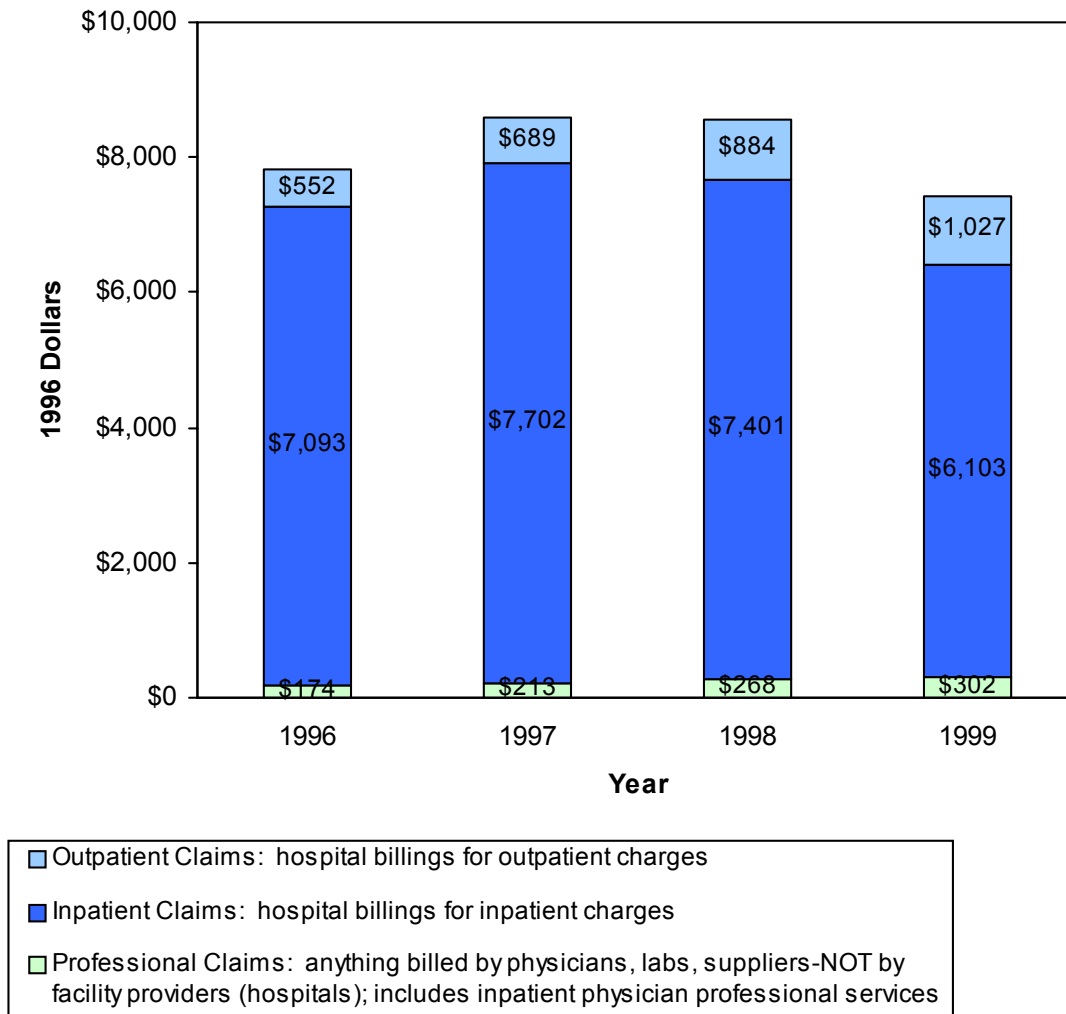
Cervical Cancer 1999 Per Case Average BCBSM Payments by Type of Claim



BCBS: fee-for-service and self-insured plans
BCN: managed care plan

Figure 22.

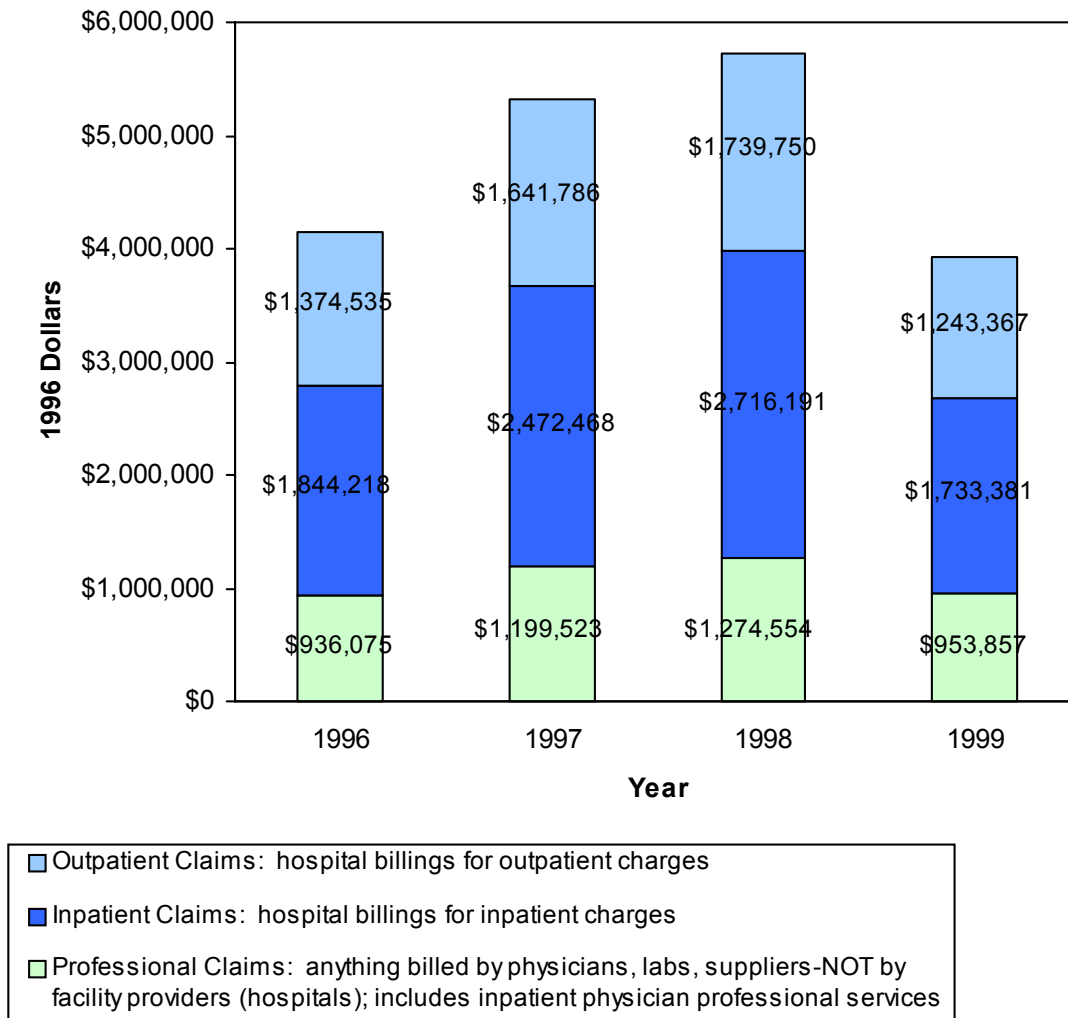
Cervical Cancer Per Case Average BCBSM* Payments by Type of Claim, 1996–1999



*Excludes managed care plan.

Figure 23.

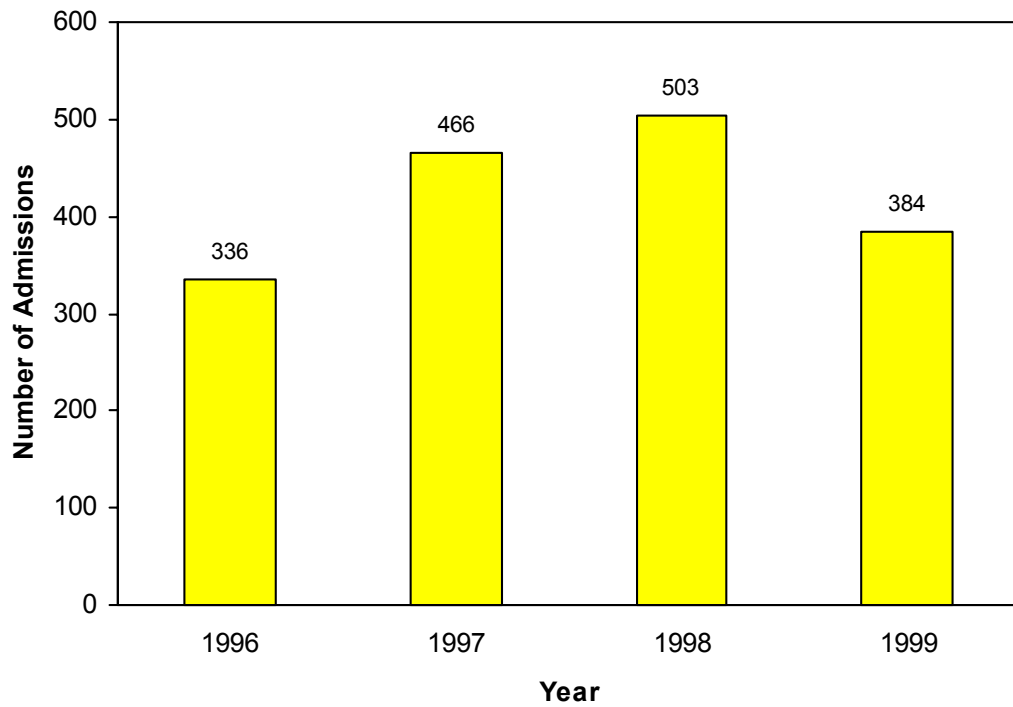
Cervical Cancer Total BCBSM* Payments by Type of Claim, 1996–1999



*Excludes managed care plan.

Figure 24.

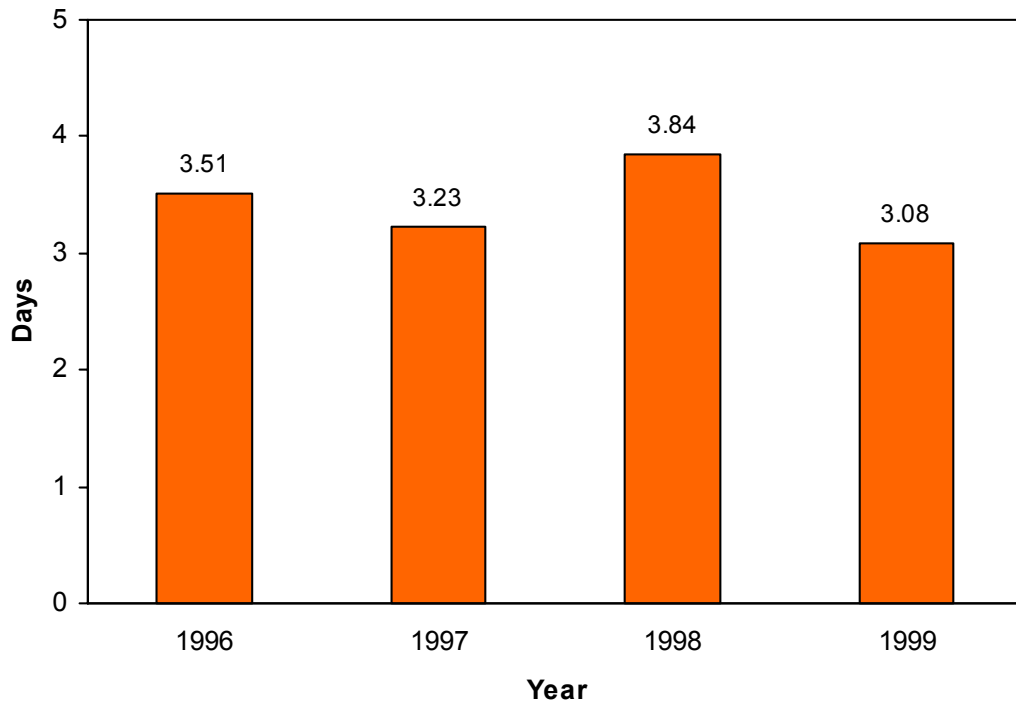
Cervical Cancer
Number of Hospital Admissions for BCBSM*
Inpatient Coverage Recipients,
1996–1999



*Excludes managed care plan.

Figure 25.

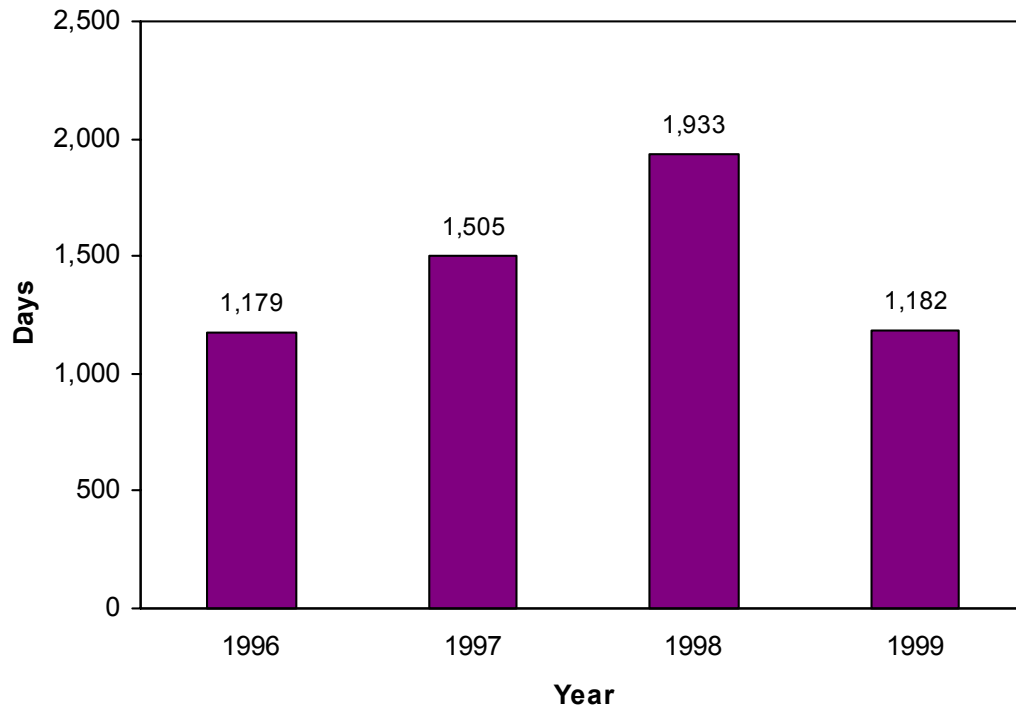
Cervical Cancer
Hospital Average Length of Stay for BCBSM*
Inpatient Coverage Recipients,
1996–1999



*Excludes managed care plan.

Figure 26.

Cervical Cancer
Total Hospital Days of Care for BCBSM*
Inpatient Coverage Recipients,
1996–1999



*Excludes managed care plan.

Figure 27.

Cervical Cancer
Per Case Average
Medicare Part A Payments,
1996–1999

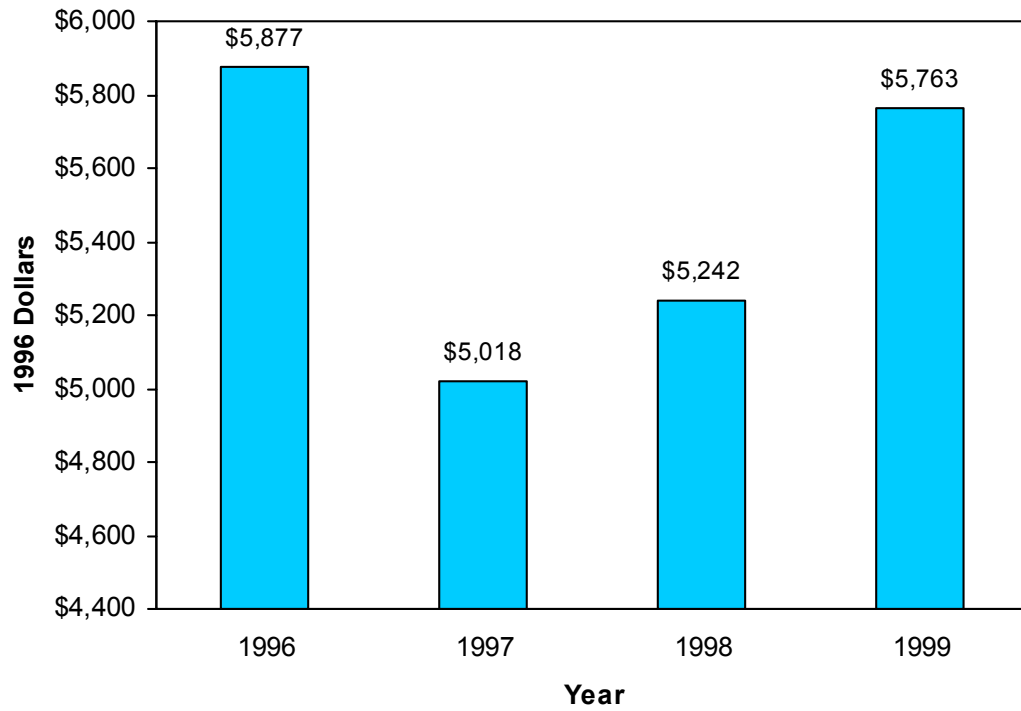


Figure 28.

Cervical Cancer Total Medicare Part A Payments, 1996–1999

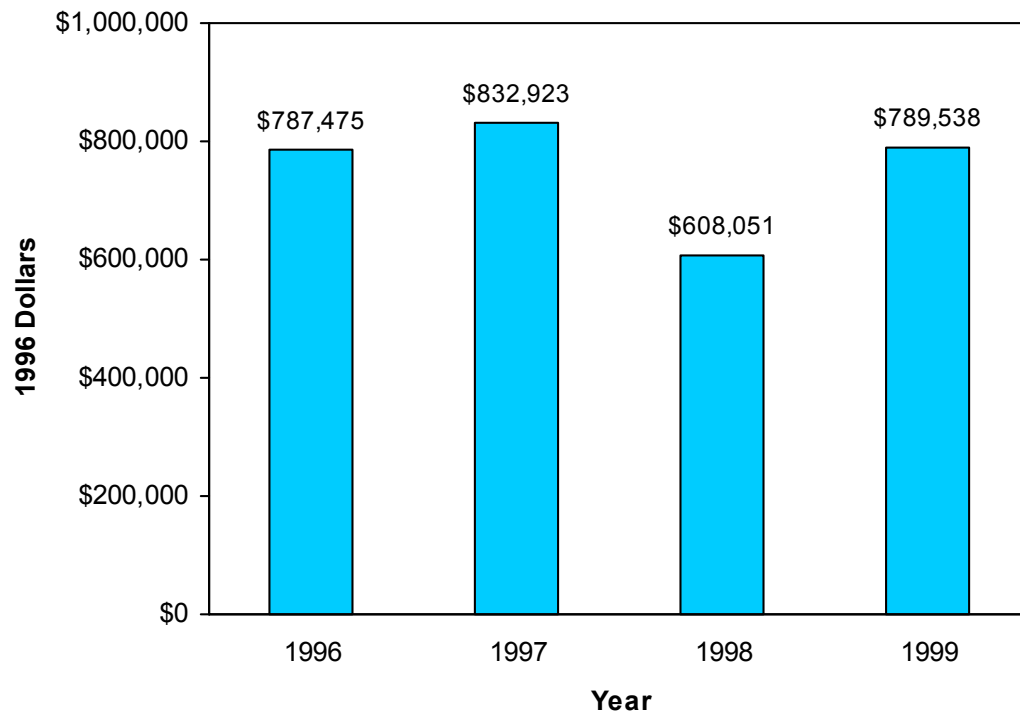


Figure 29.

**Cervical Cancer
Hospital Average Length of Stay for
Medicare Part A Recipients,
1996–1999**

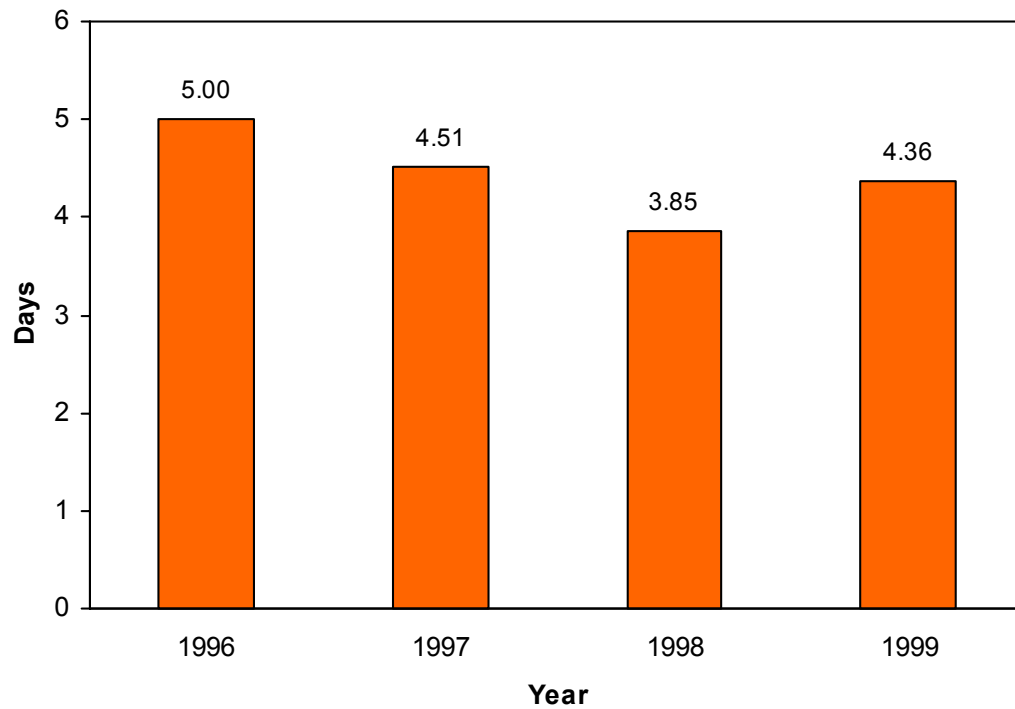


Figure 30.

Cervical Cancer
Hospital Days of Care for
Medicare Part A Recipients,
1996–1999

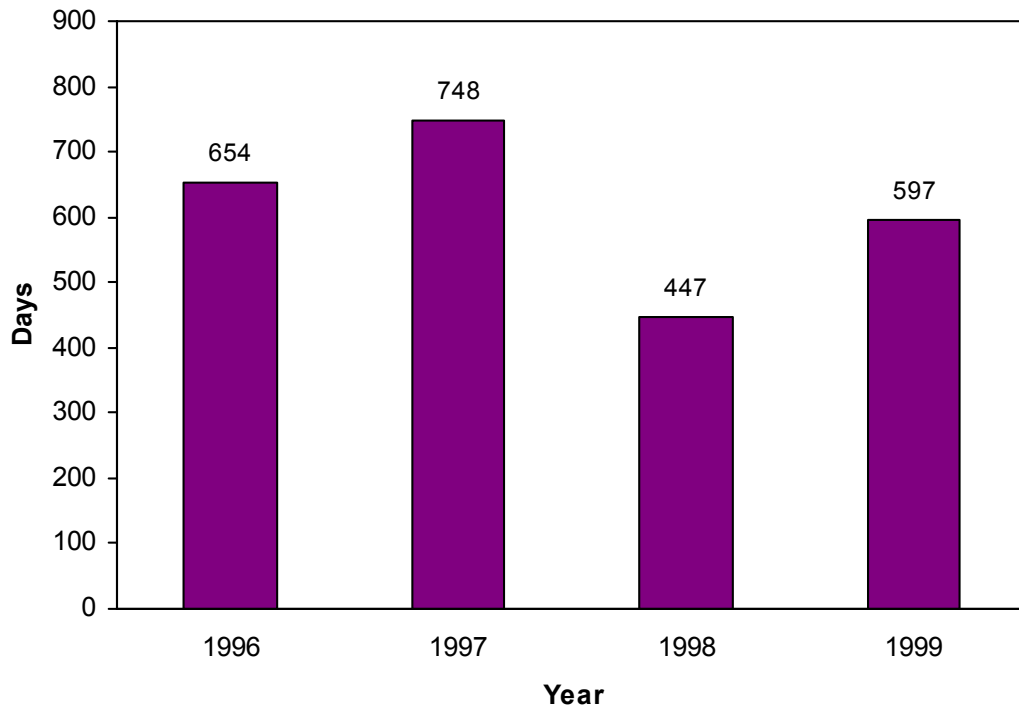
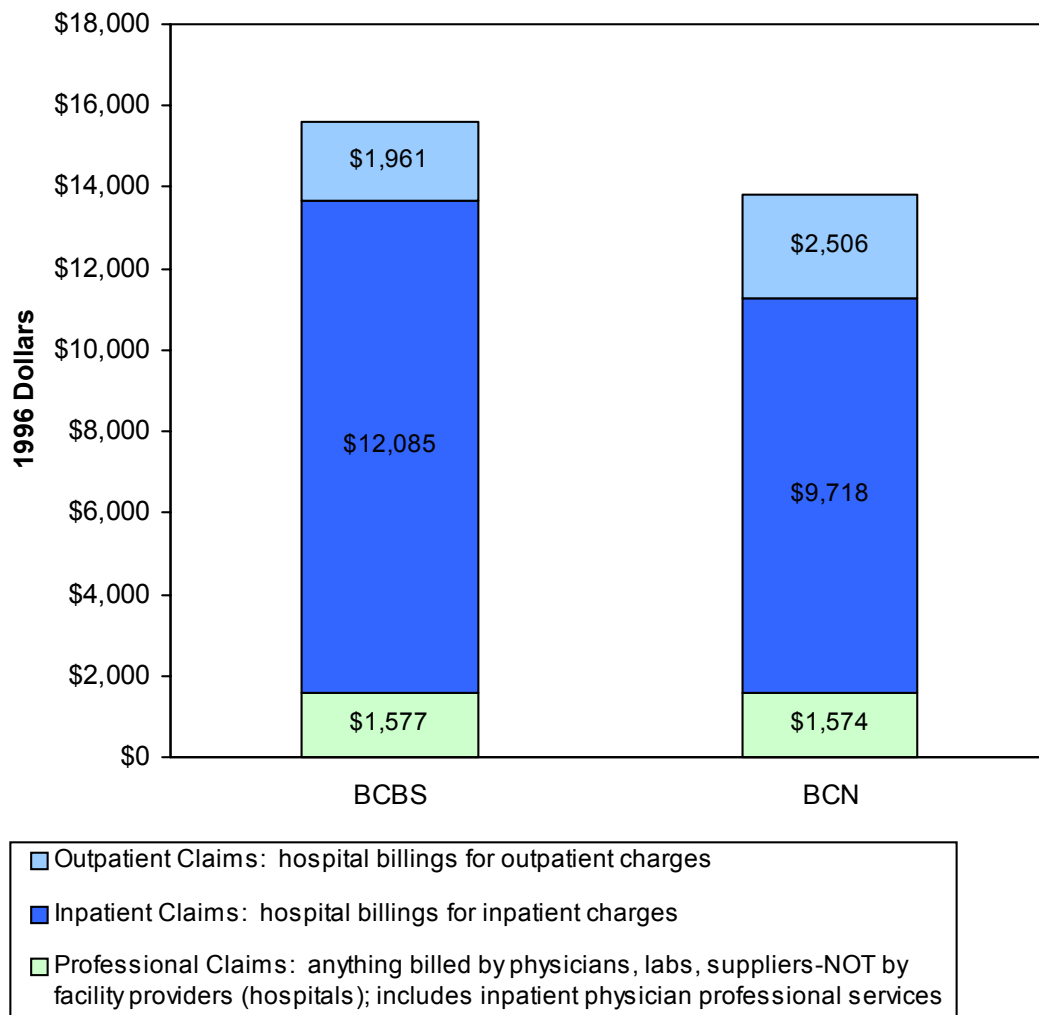


Figure 31.

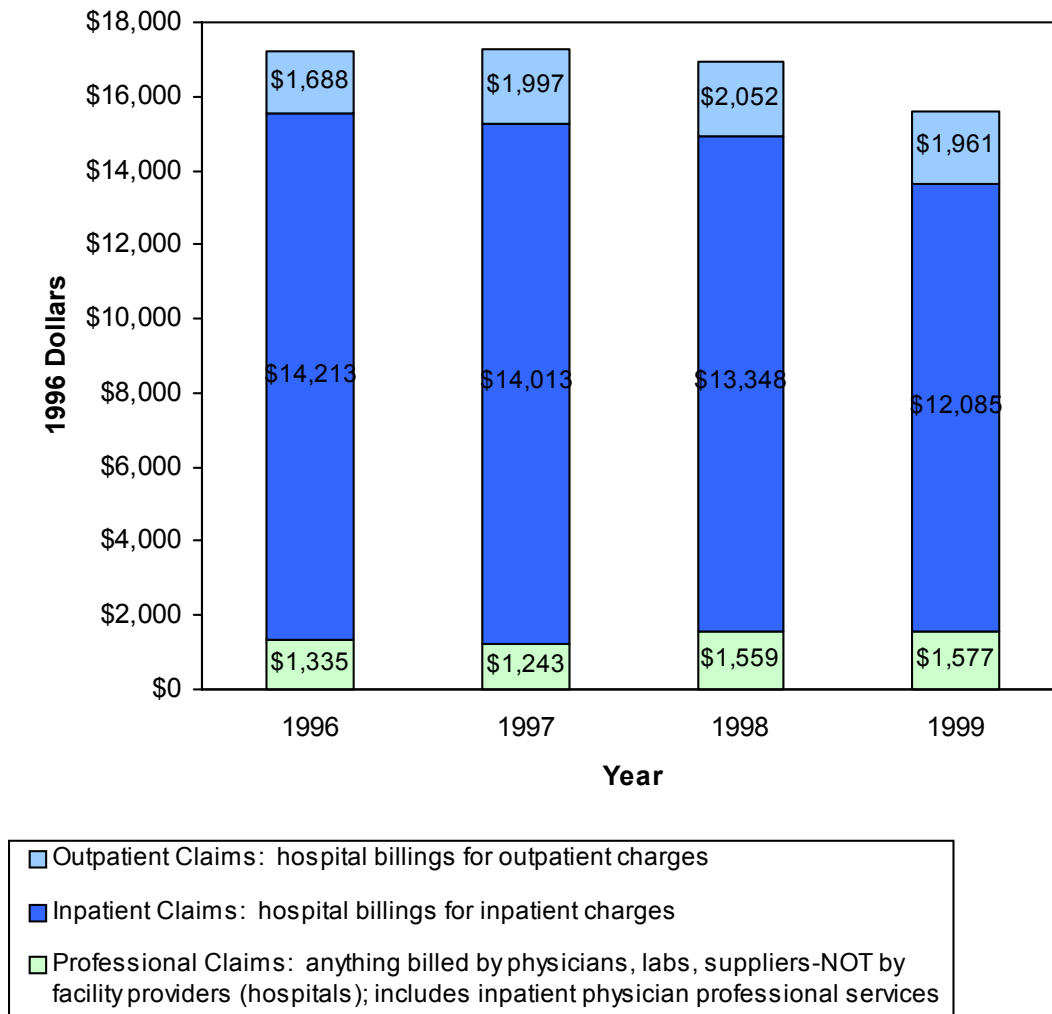
Colorectal Cancer 1999 Per Case Average BCBSM Payments by Type of Claim



BCBS: fee-for-service and self-insured plans
BCN: managed care plan

Figure 32.

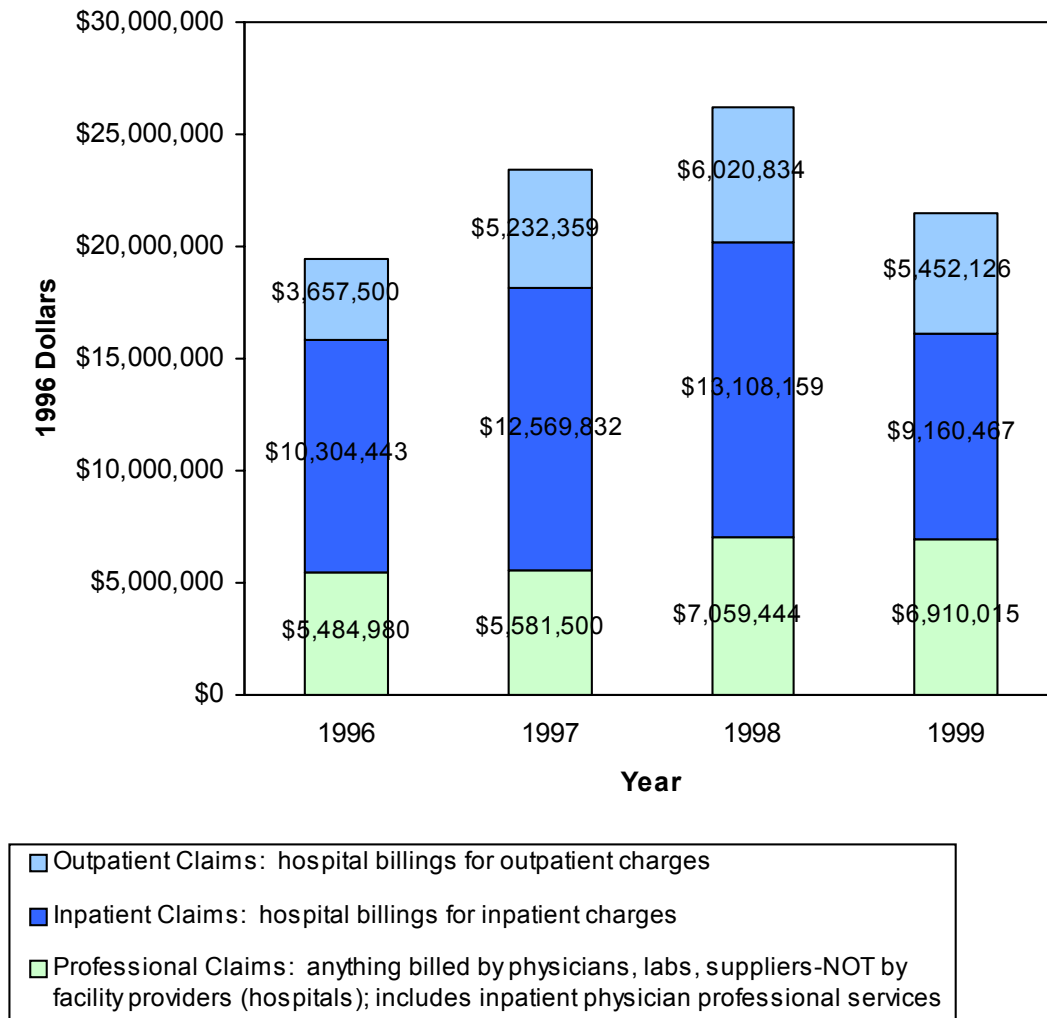
Colorectal Cancer Per Case Average BCBSM* Payments by Type of Claim, 1996–1999



*Excludes managed care plan.

Figure 33.

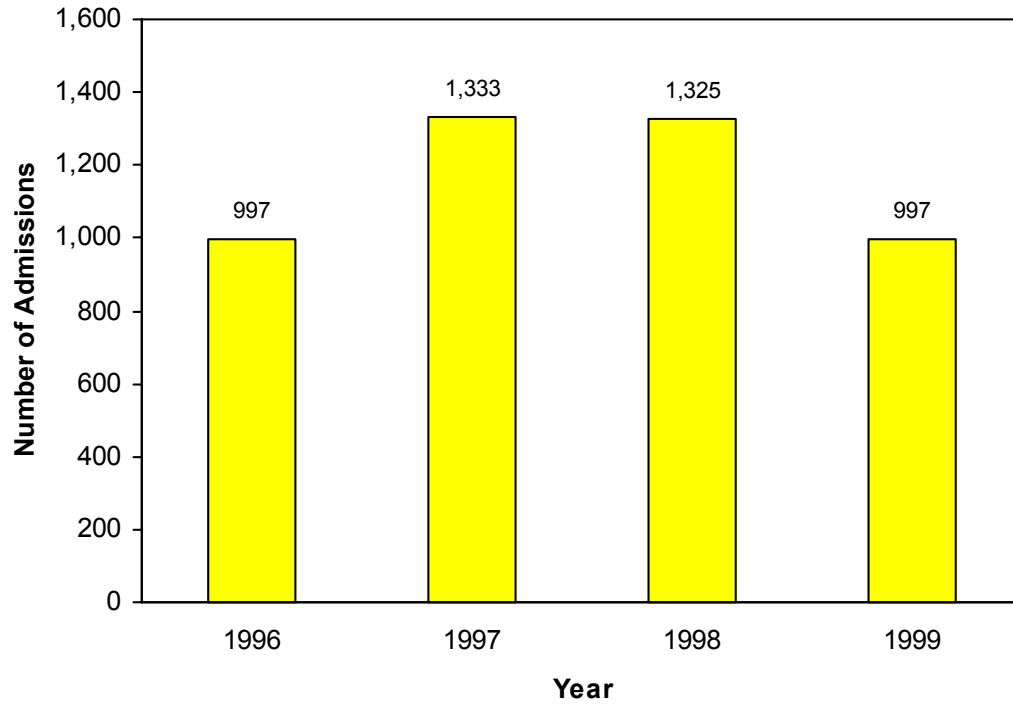
Colorectal Cancer Total BCBSM* Payments by Type of Claim, 1996–1999



*Excludes managed care plan.

Figure 34.

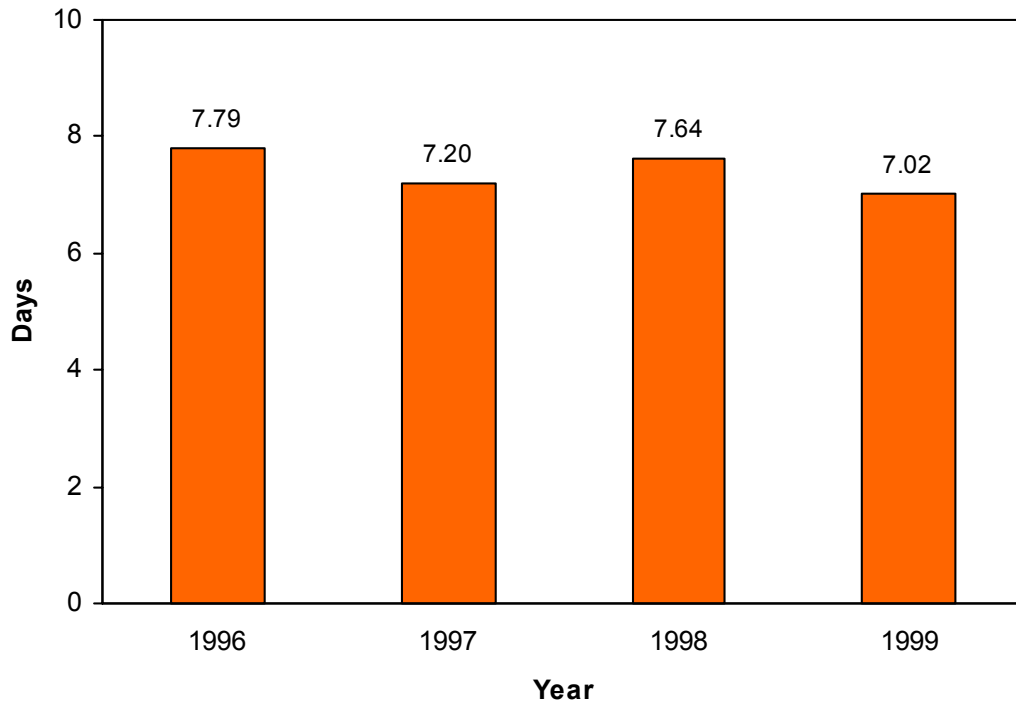
**Colorectal Cancer
Number of Hospital Admissions for BCBSM*
Inpatient Coverage Recipients,
1996–1999**



*Excludes managed care plan.

Figure 35.

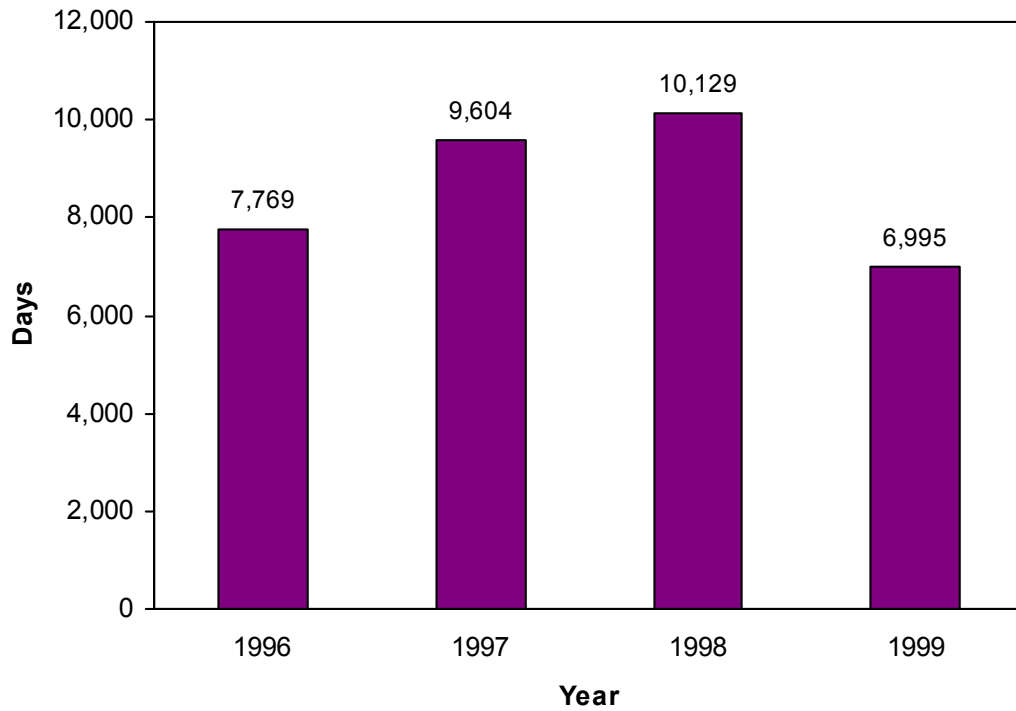
Colorectal Cancer
Hospital Average Length of Stay for BCBSM*
Inpatient Coverage Recipients,
1996–1999



*Excludes managed care plan.

Figure 36.

Colorectal Cancer
Total Hospital Days of Care for BCBSM*
Inpatient Coverage Recipients,
1996–1999



*Excludes managed care plan.

Figure 37.

Colorectal Cancer
Per Case Average
Medicare Part A Payments,
1996–1999

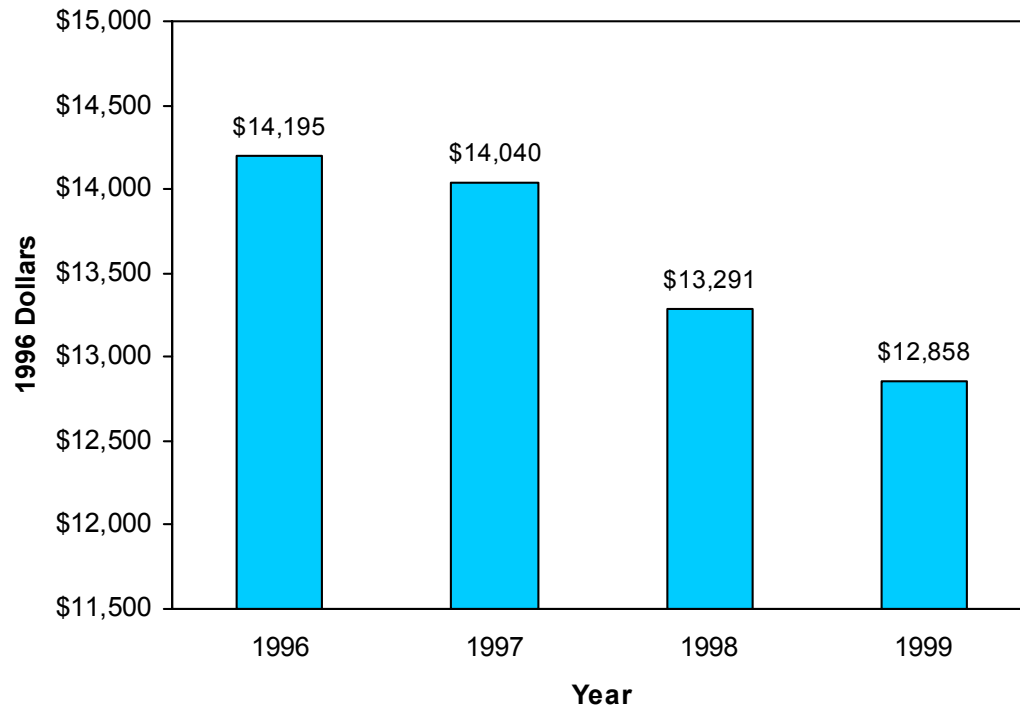


Figure 38.

Colorectal Cancer Total Medicare Part A Payments, 1996–1999

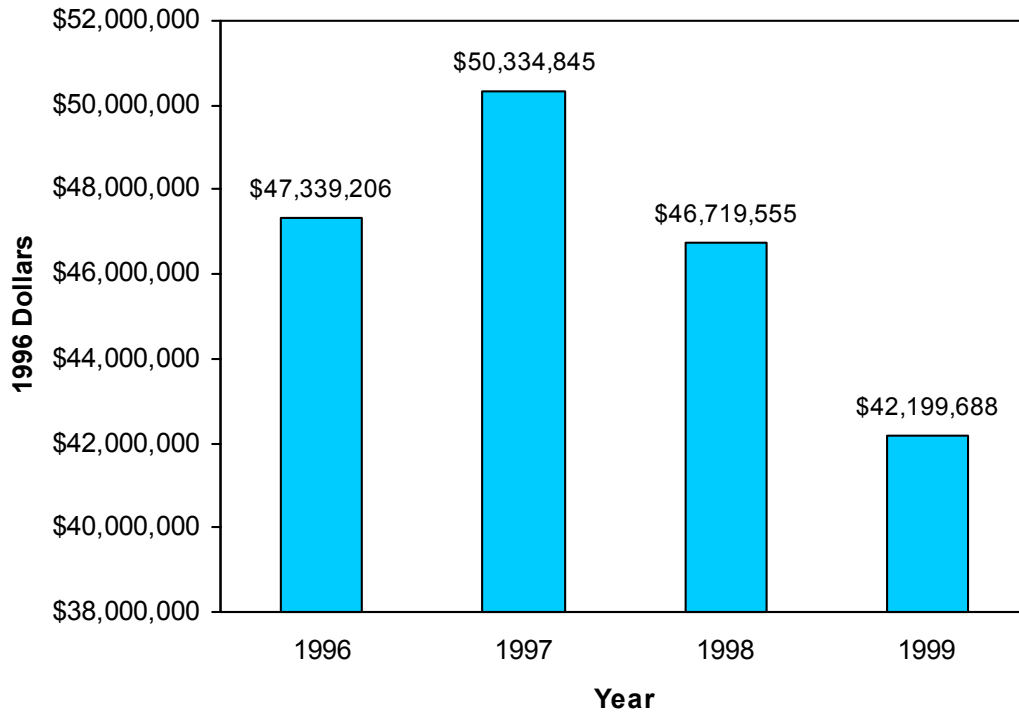


Figure 39.

Colorectal Cancer
Hospital Average Length of Stay for
Medicare Part A Recipients,
1996–1999

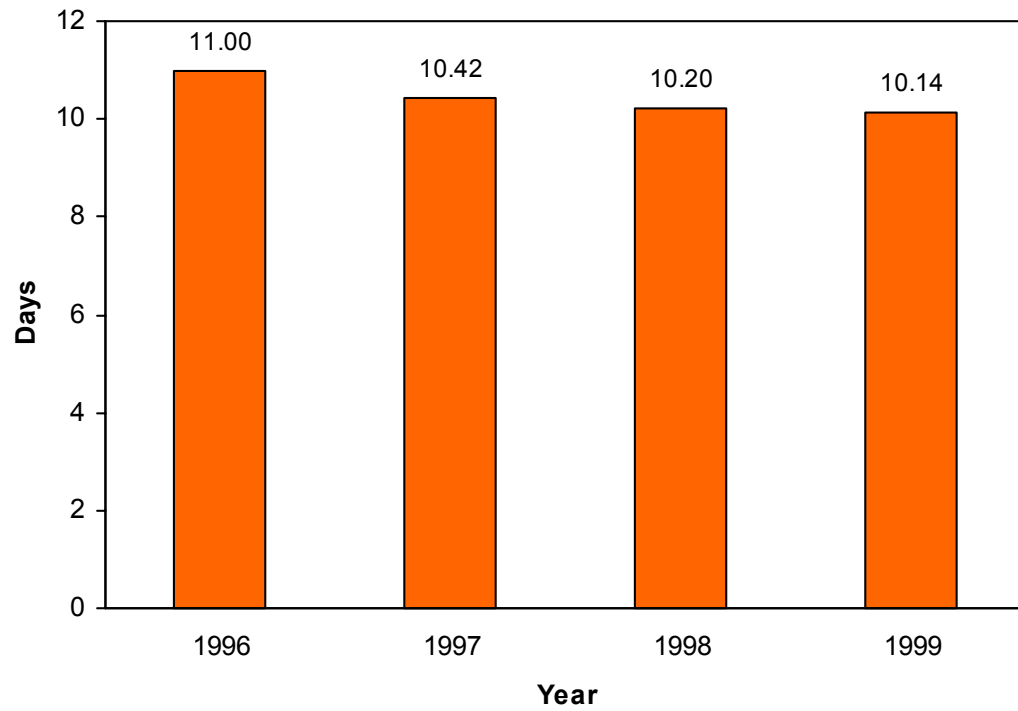


Figure 40.

Colorectal Cancer
Hospital Days of Care for
Medicare Part A Recipients,
1996–1999

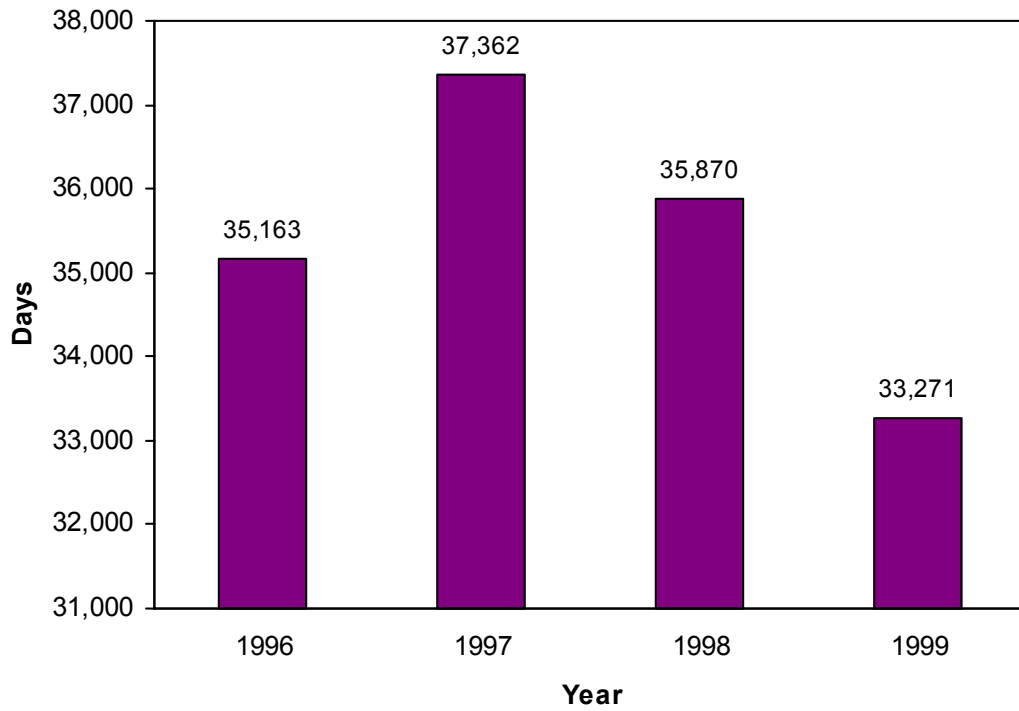
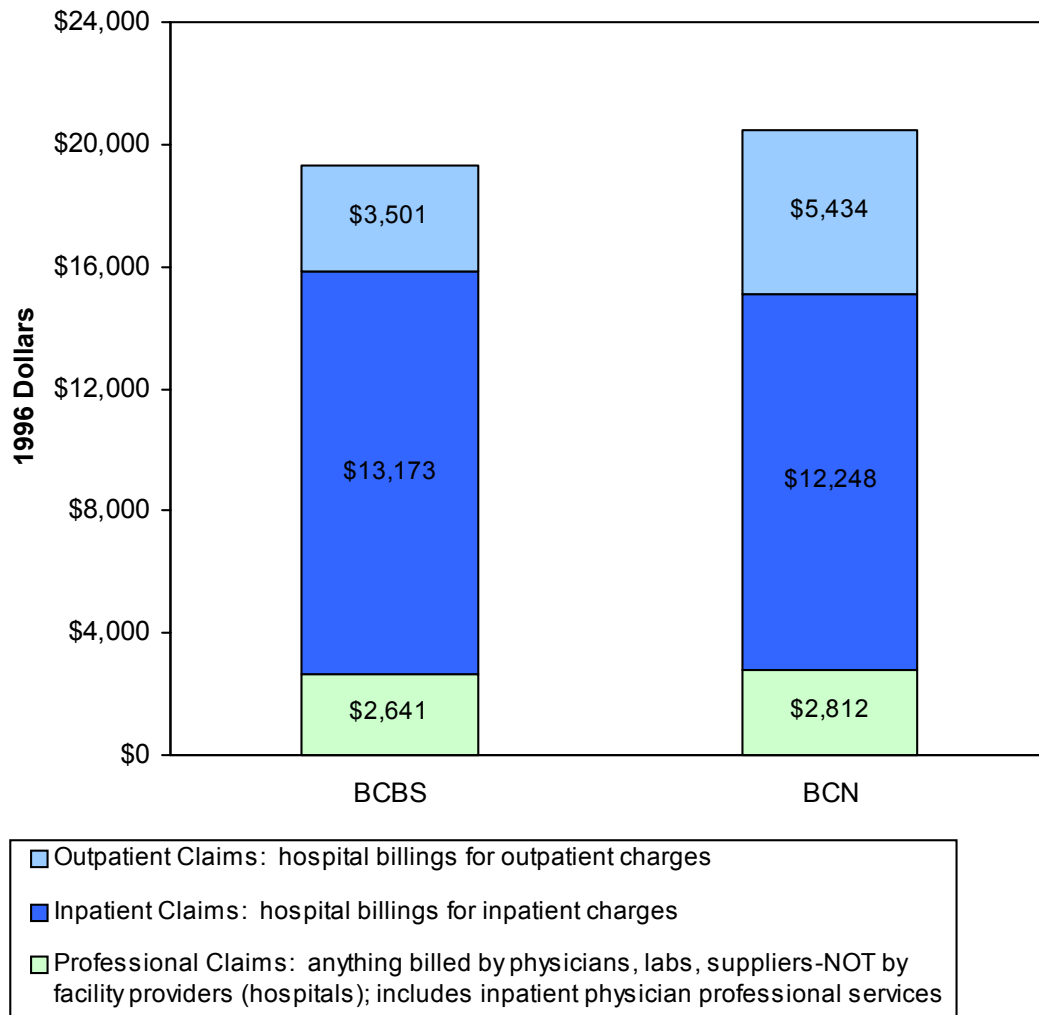


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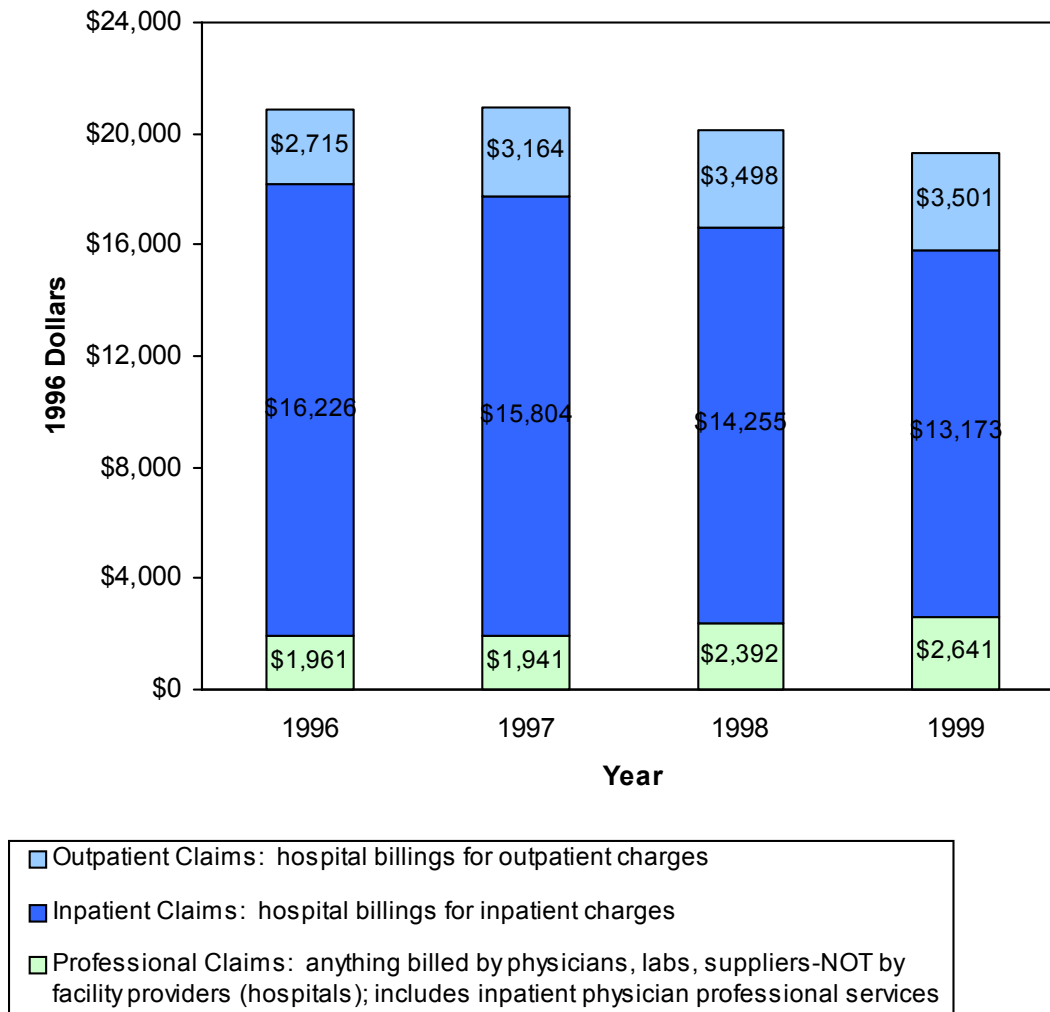
Lung Cancer 1999 Per Case Average BCBSM Payments by Type of Claim



BCBS: fee-for-service and self-insured plans
BCN: managed care plan

Figure 42.

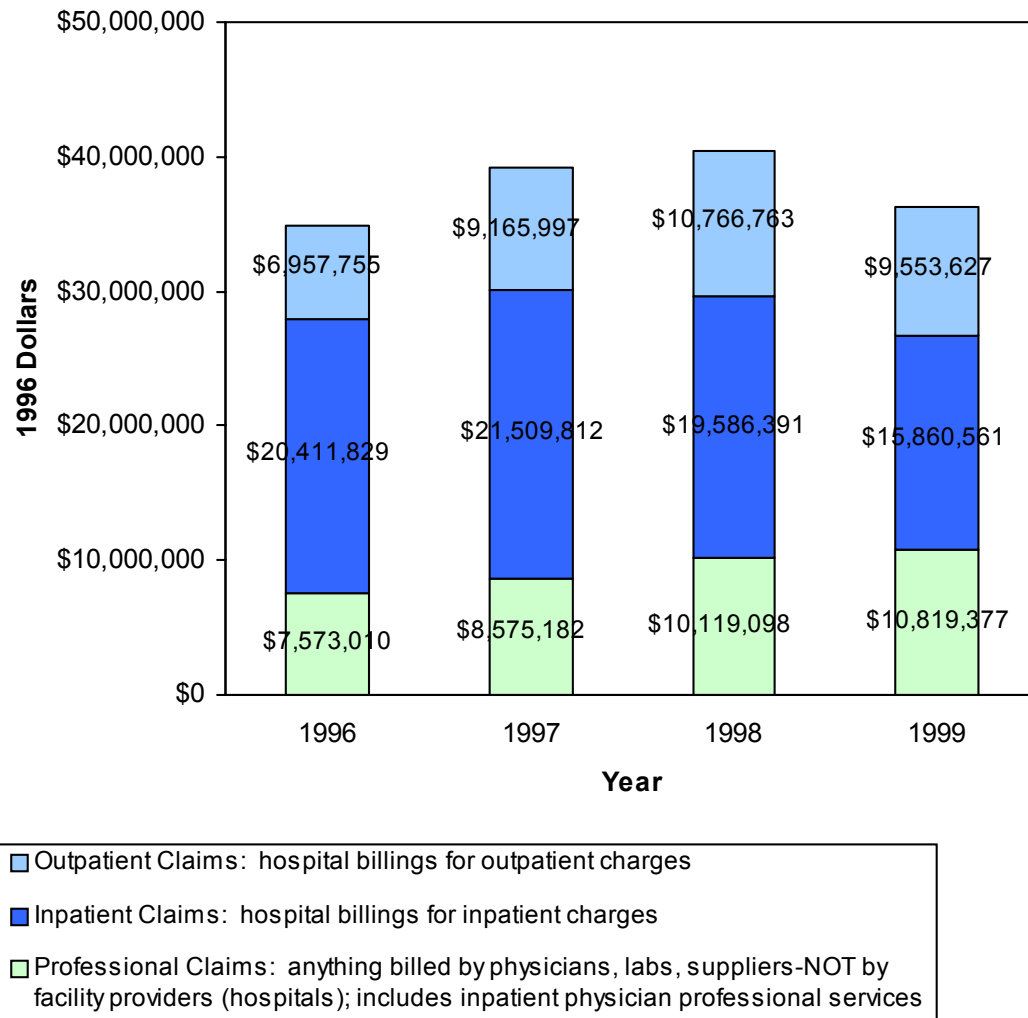
Lung Cancer Per Case Average BCBSM* Payments by Type of Claim, 1996–1999



*Excludes managed care plan.

Figure 43.

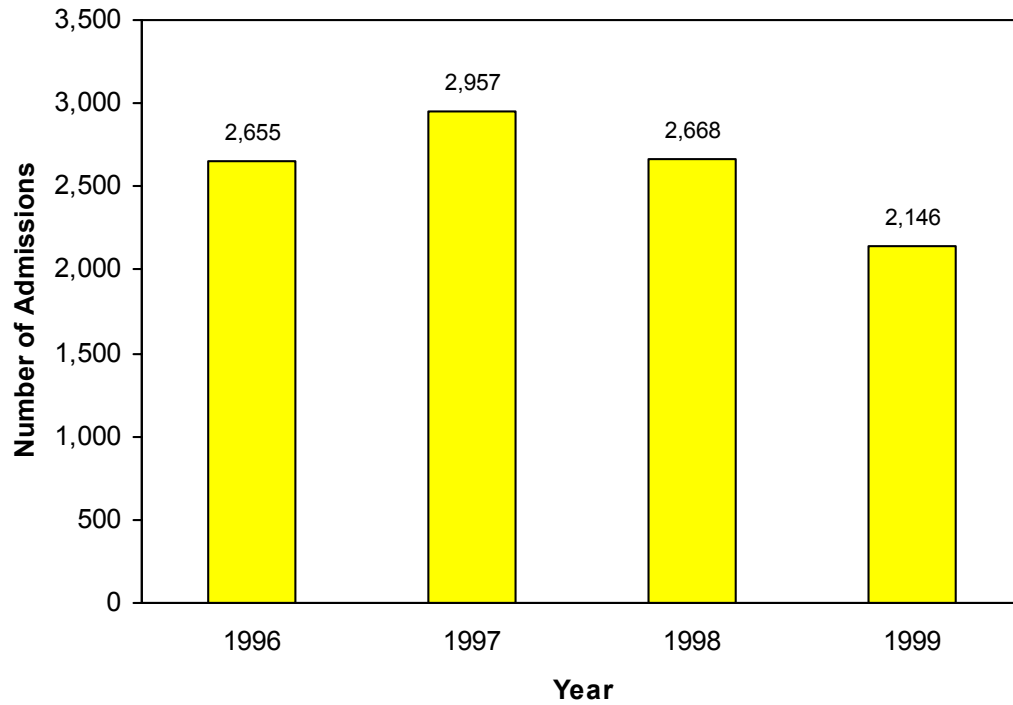
Lung Cancer Total BCBSM* Payments by Type of Claim, 1996–1999



*Excludes managed care plan.

Figure 44.

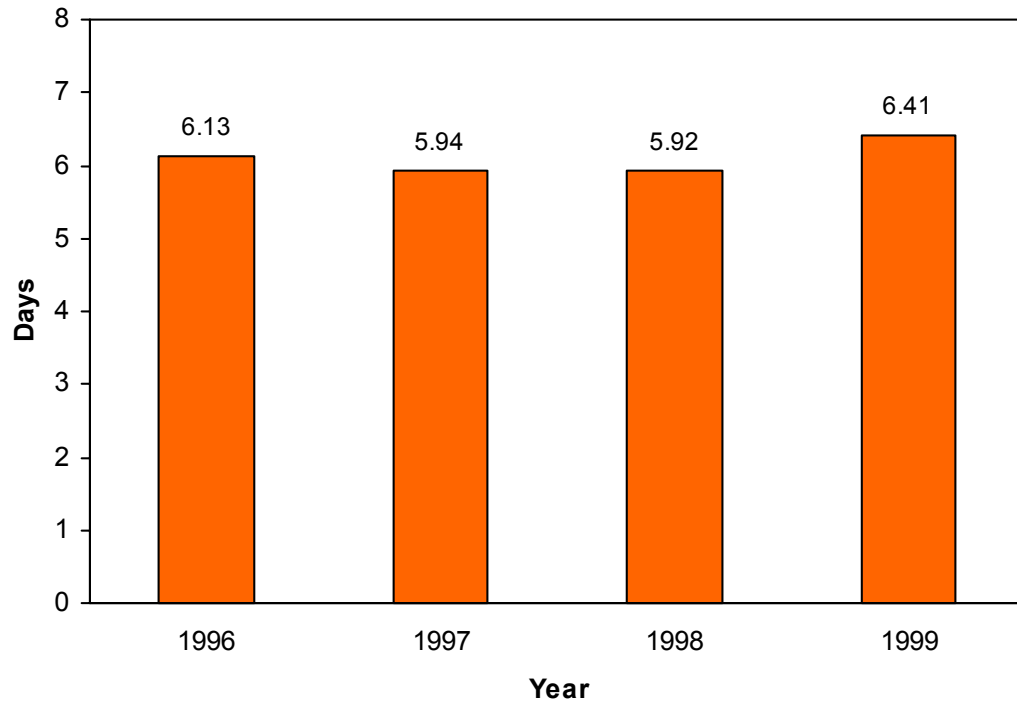
Lung Cancer
Number of Hospital Admissions for BCBSM*
Inpatient Coverage Recipients,
1996–1999



*Excludes managed care plan.

Figure 45.

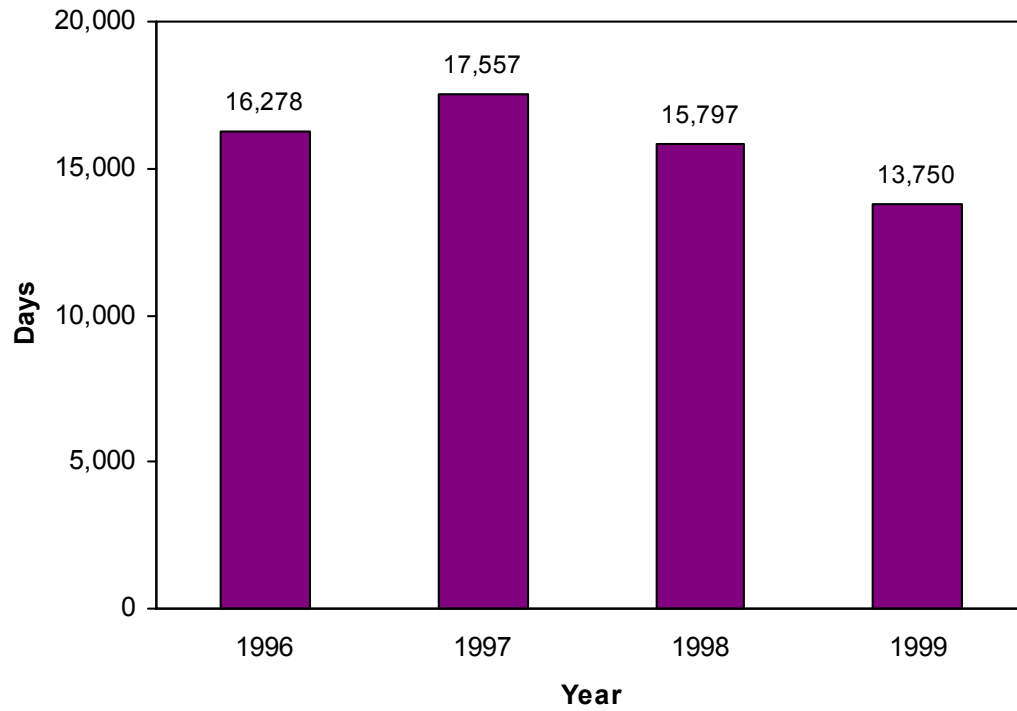
Lung Cancer
Hospital Average Length of Stay for BCBSM*
Inpatient Coverage Recipients,
1996–1999



*Excludes managed care plan.

Figure 46.

Lung Cancer
Total Hospital Days of Care for BCBSM*
Inpatient Coverage Recipients,
1996–1999



*Excludes managed care plan.

Figure 47.

Lung Cancer
Per Case Average
Medicare Part A Payments,
1996–1999

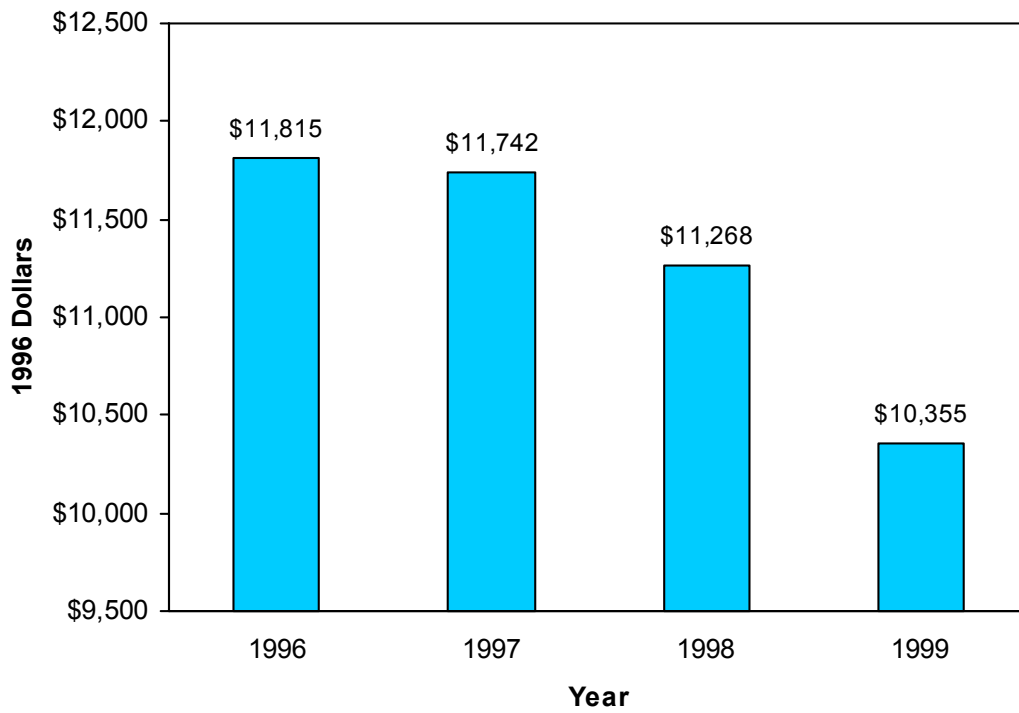


Figure 48.

Lung Cancer Total Medicare Part A Payments, 1996–1999

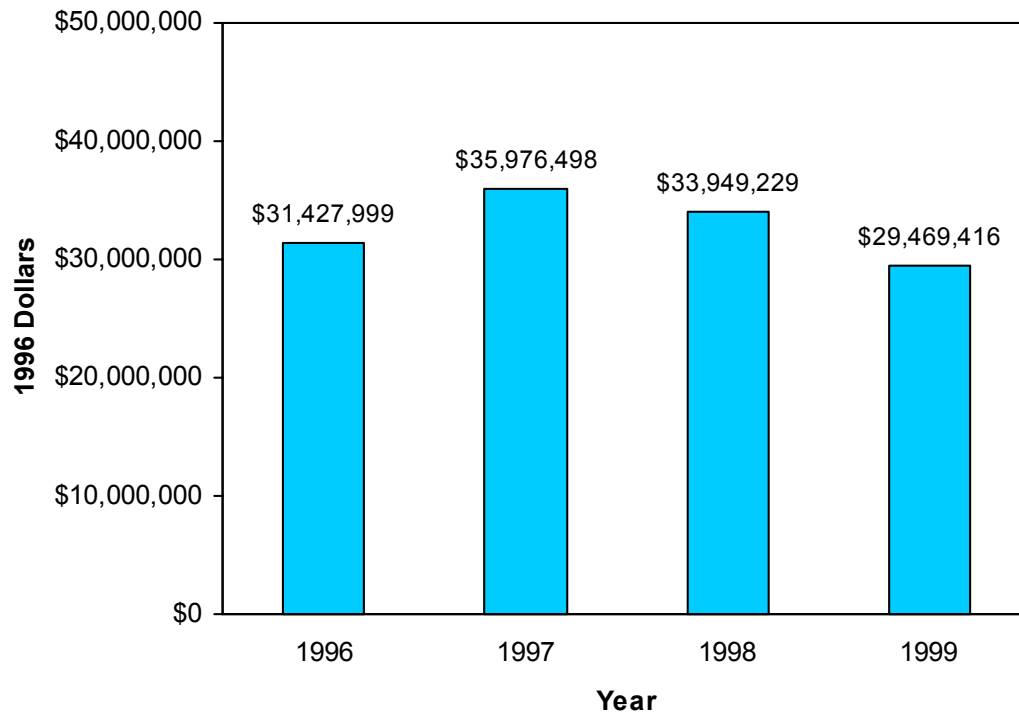


Figure 49.

Lung Cancer
Hospital Average Length of Stay for
Medicare Part A Recipients,
1996–1999

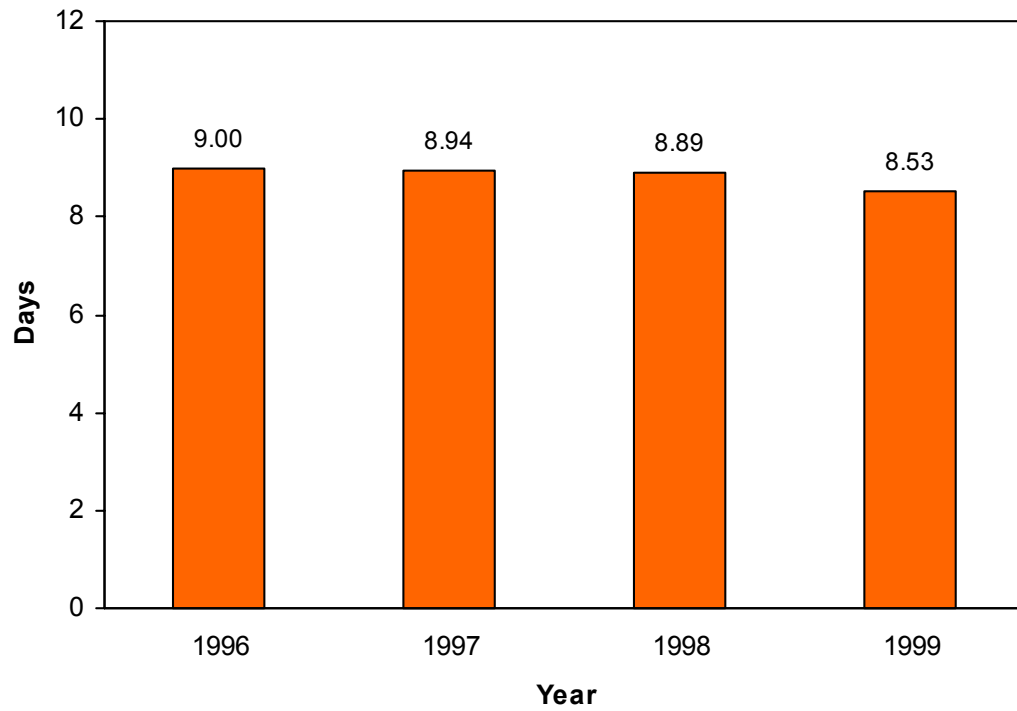


Figure 50.

**Lung Cancer
Hospital Days of Care for
Medicare Part A Recipients,
1996–1999**

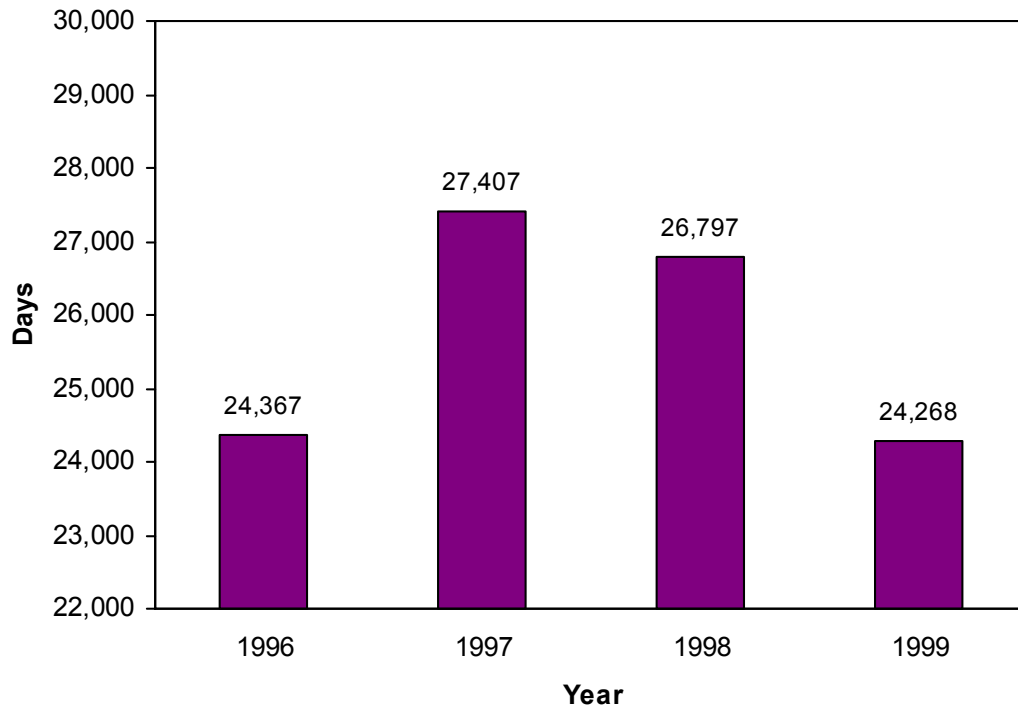
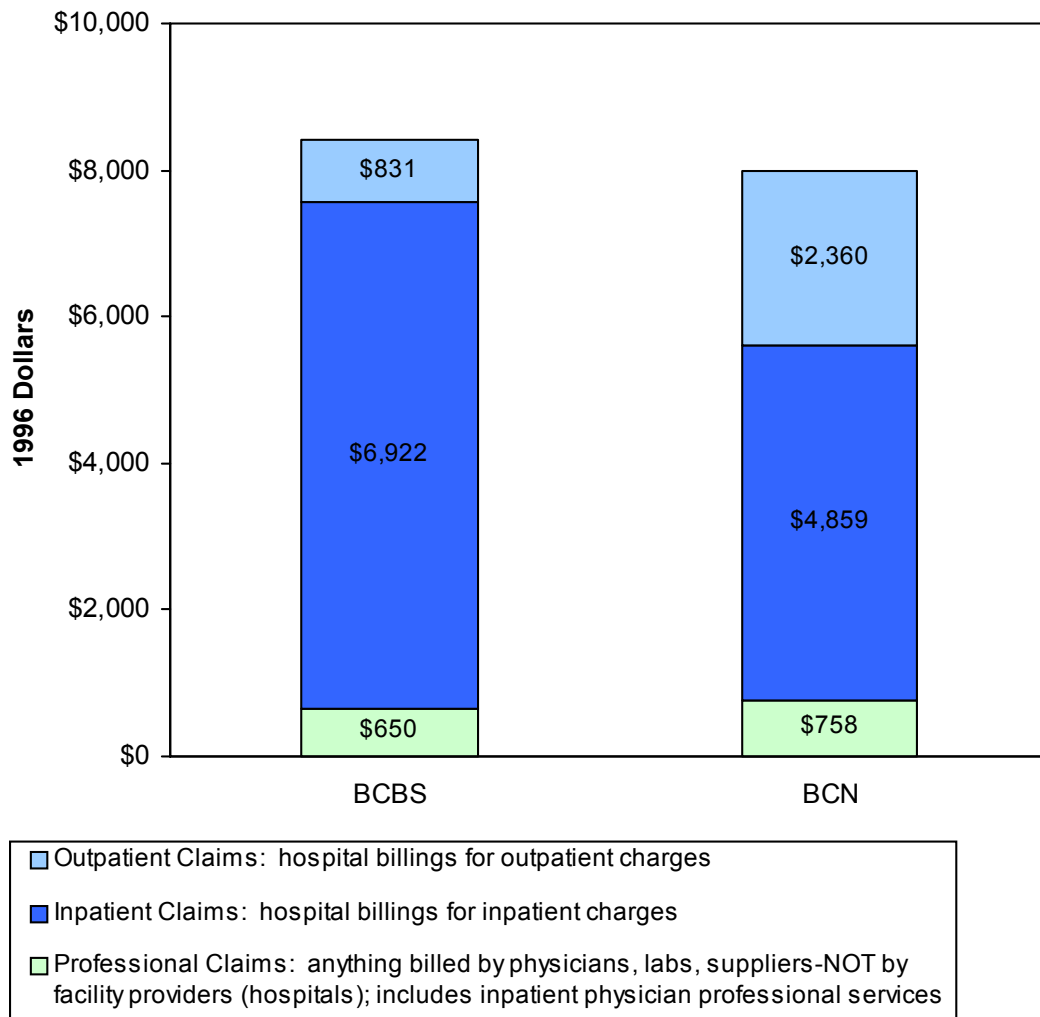


Figure 51.

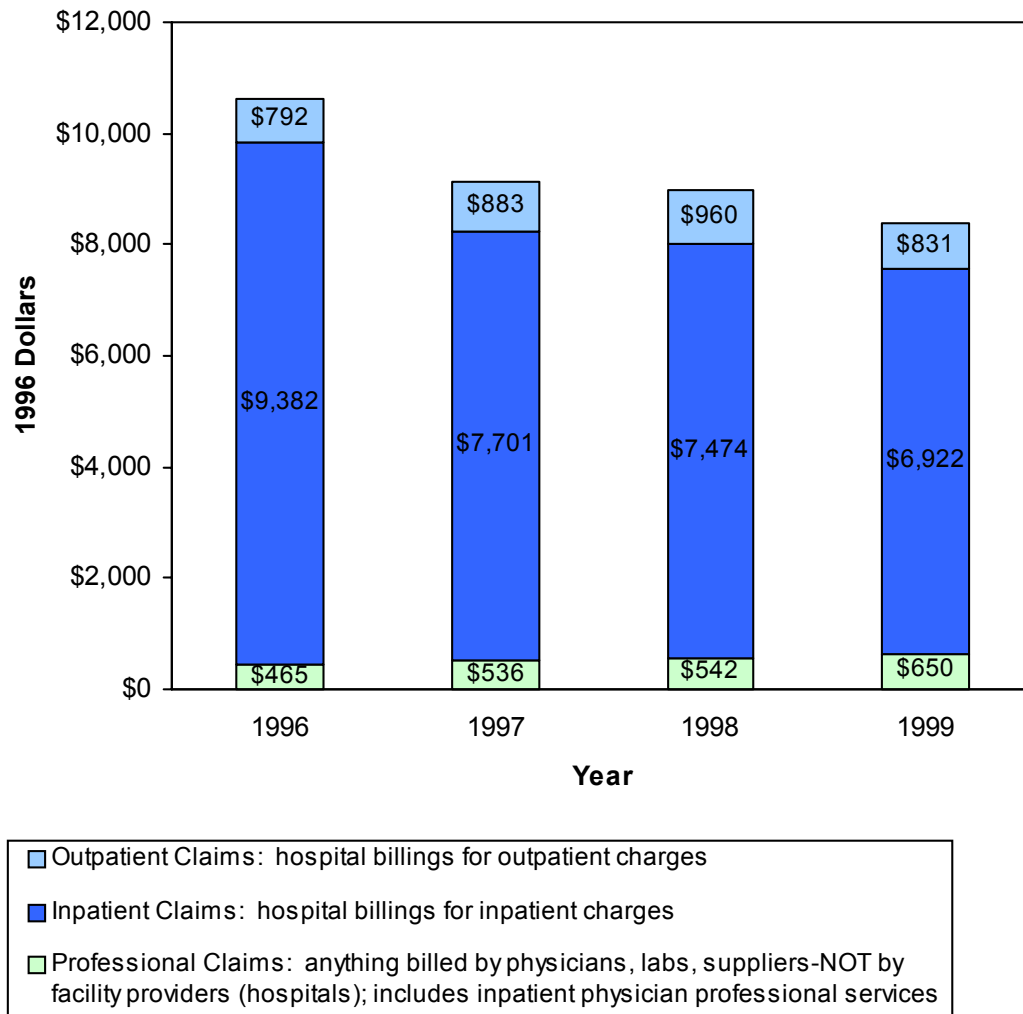
Prostate Cancer 1999 Per Case Average BCBSM Payments by Type of Claim



BCBS: fee-for-service and self-insured plans
BCN: managed care plan

Figure 52.

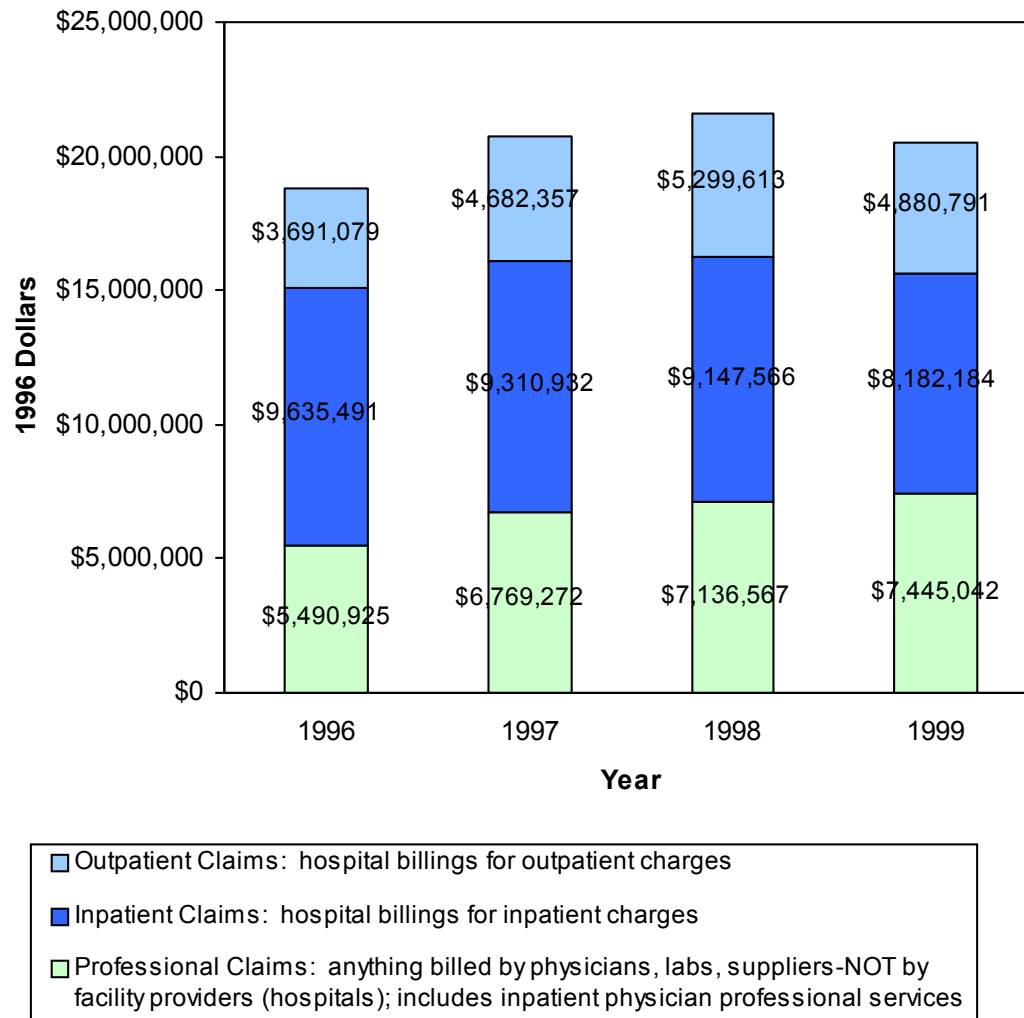
Prostate Cancer Per Case Average BCBSM* Payments by Type of Claim, 1996–1999



*Excludes managed care plan.

Figure 53.

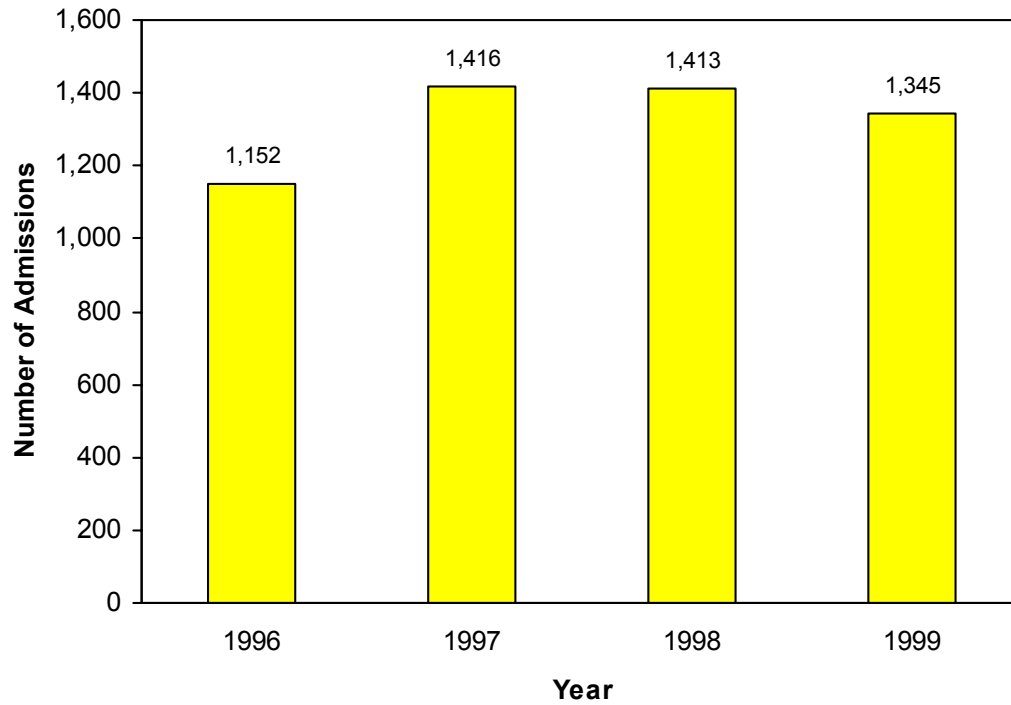
Prostate Cancer Total BCBSM* Payments by Type of Claim, 1996–1999



*Excludes managed care plan.

Figure 54.

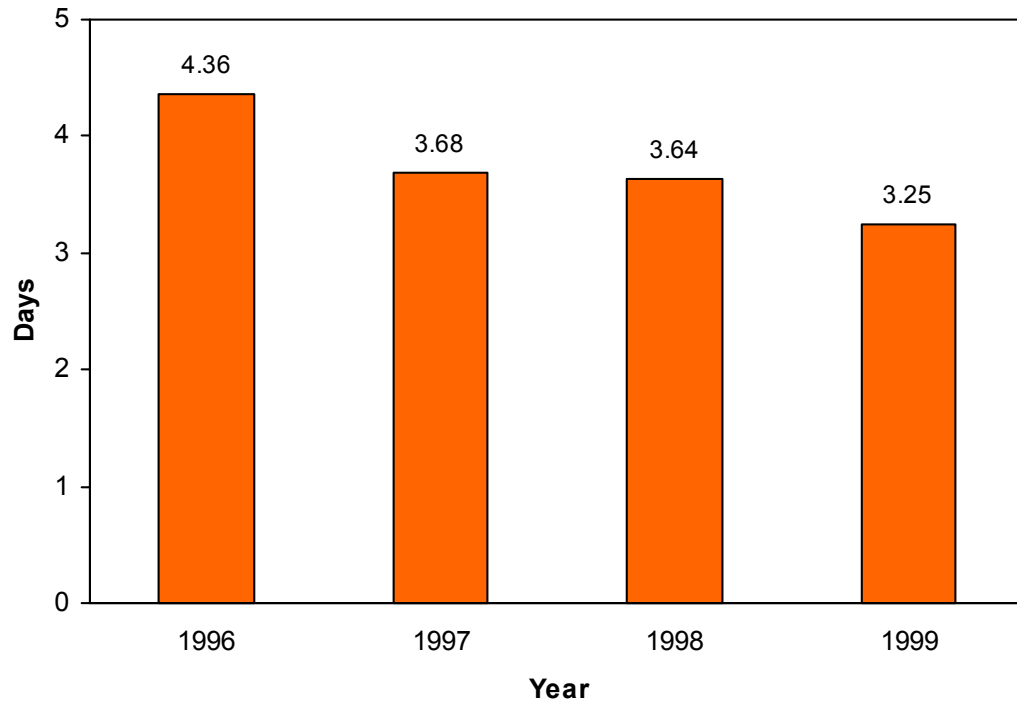
Prostate Cancer
Number of Hospital Admissions for BCBSM*
Inpatient Coverage Recipients,
1996–1999



*Excludes managed care plan.

Figure 55.

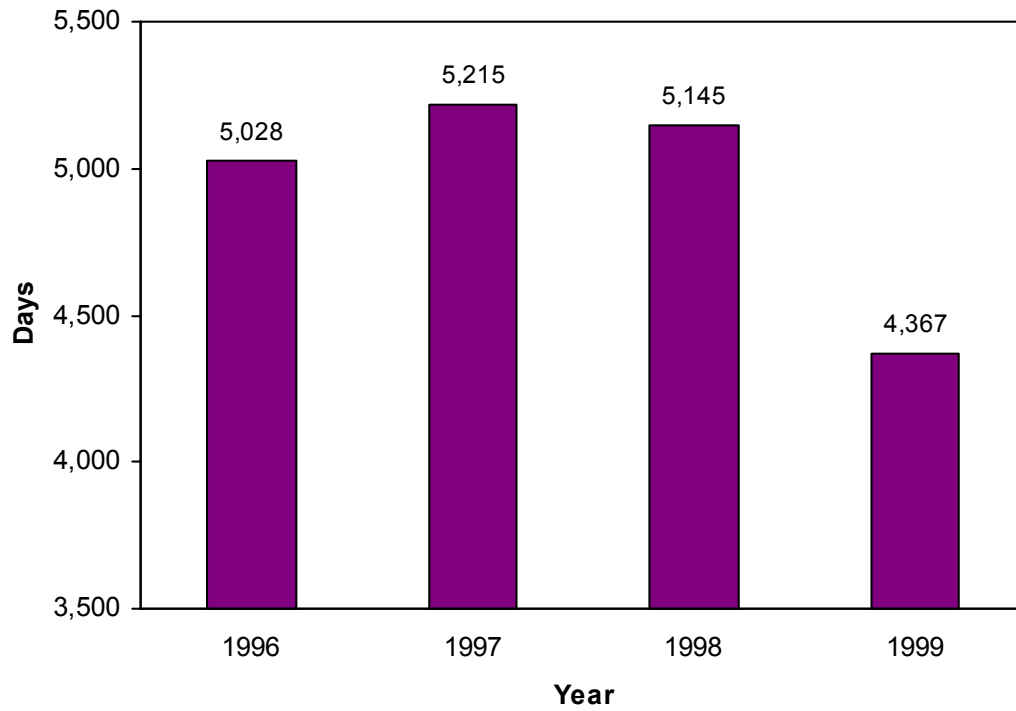
Prostate Cancer
Hospital Average Length of Stay for BCBSM*
Inpatient Coverage Recipients,
1996–1999



*Excludes managed care plan.

Figure 56.

Prostate Cancer
Total Hospital Days of Care for BCBSM*
Inpatient Coverage Recipients,
1996–1999



*Excludes managed care plan.

Figure 57.

Prostate Cancer
Per Case Average
Medicare Part A Payments,
1996–1999

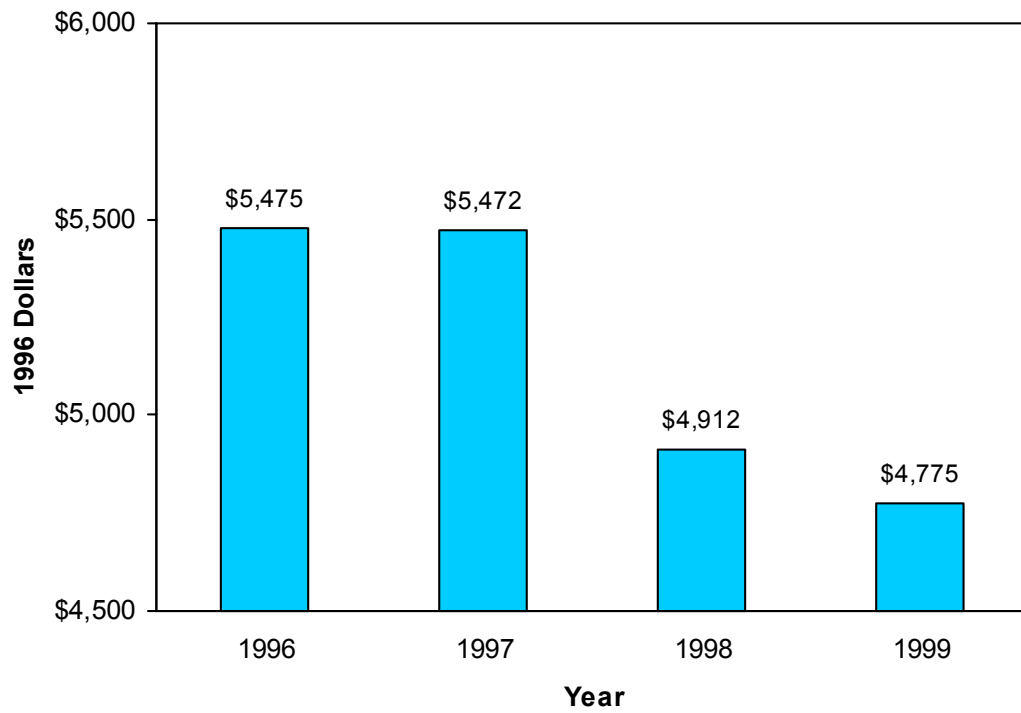


Figure 58.

Prostate Cancer Total Medicare Part A Payments, 1996–1999

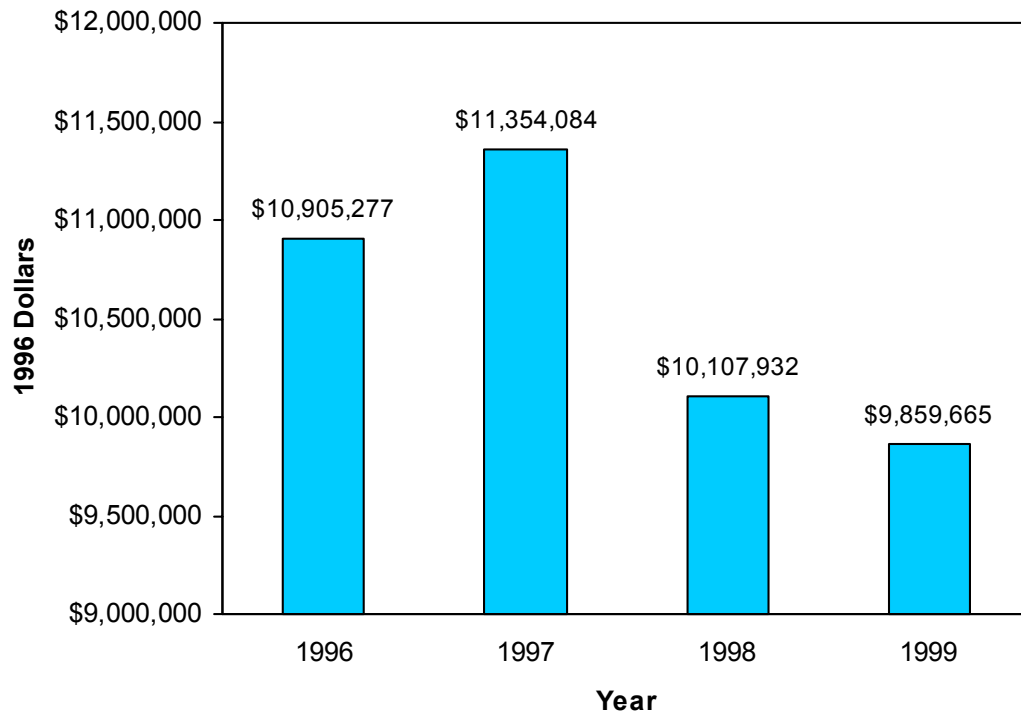


Figure 59.

Prostate Cancer
Hospital Average Length of Stay for
Medicare Part A Recipients,
1996–1999

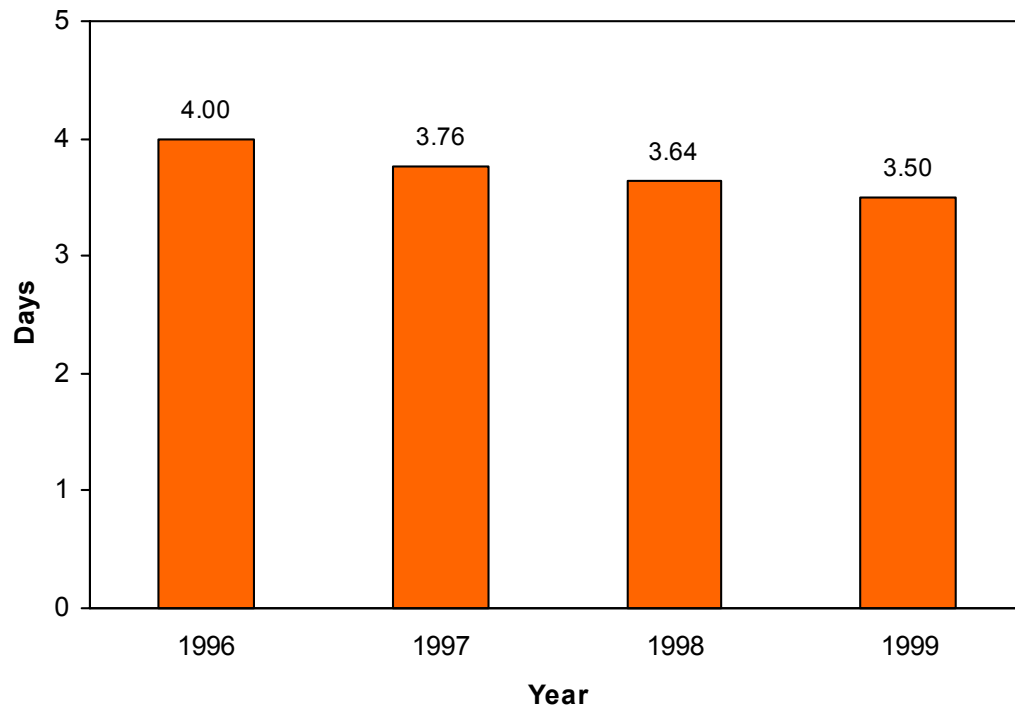
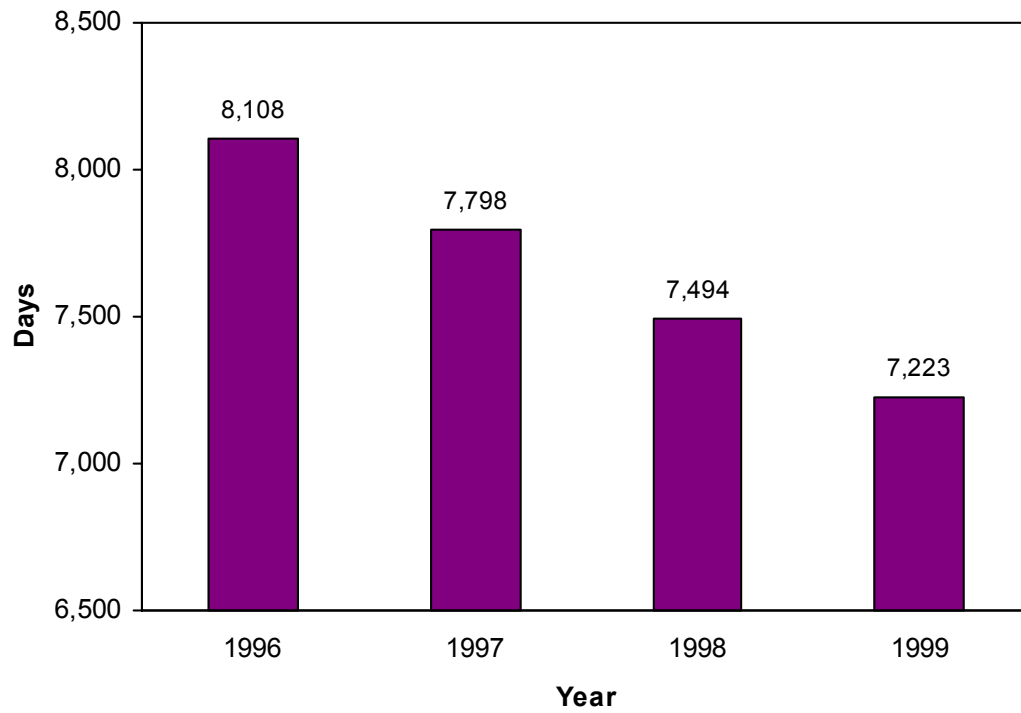


Figure 60.

Prostate Cancer
Hospital Days of Care for
Medicare Part A Recipients,
1996–1999



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Mammography and Radiation Facility Distribution in Michigan

The distributions of mammography and radiation therapy facilities in Michigan are illustrated in this Appendix. The number of mammography and radiation therapy facilities per county are presented. Facility information was received from the Michigan Department of Consumer Industry Services, Radiation Safety Section.¹ Mammography and radiation therapy facilities were geocoded by Zip codes using a Geographic Information System (GIS), and their locations throughout the state are shown.² Distance analysis was performed to calculate the proportion of women in Michigan that are farther than 30 miles from any mammography facility and the proportion of the total population that is farther than 45 miles from any radiation therapy facility.³ The most recent actual population data available, data for 1999, are presented to illustrate potential demand for mammography and radiation therapy facilities in counties.⁴

Summary

Figures 1 through 6 present mammography facility and radiation therapy facility locations throughout the state and female and total population sizes by county. Within a priority objective of the Michigan Cancer Consortium Initiative (MCCI) related to breast cancer screening is the objective that all women should have access to clinical breast examination and mammography within 30 miles or 30 minutes of home. Analyses of mammography facility locations found that 99.9% of the female population in Michigan is within 30 miles of a mammography facility. Analysis of radiation therapy facility locations found 2.1% of the total Michigan population is farther than 45 miles from any radiation therapy facility. Direct distances between points are analyzed rather than actual road distance traveled. This analysis does not describe factors affecting the ease of accessibility to facilities such as the availability of public transportation, nor does it describe the utilization of the facilities.

1 Mammography Facility Status in Michigan, October 23, 2001 and Therapy Accelerator Facilities in Michigan, October 23, 2001, Michigan Department of Consumer Industry Services, Radiation Safety Section.

2 ESRI's ArcView GIS was used for mapping locations of facilities. When Zip codes provided by the Michigan Department of Consumer Industry Services were not matched with Zip codes in the ArcView data for geocoding, the Zip Code Lookup on the US Postal Service website was used to find Zip codes according to street addresses.

3 Distance analyses were performed using an Equidistant Conic Projection for the Conterminus U.S.. Distances from the center points of Zip code areas to the center of census block groups were calculated, and the populations of block groups in 1990 were used to determine the approximate proportions of population subgroups that are within a specified distance from a facility.

4 Population data provided by the Michigan Department of Management and Budget, received December 19, 2000.

Number of Mammography Facilities by County, 2001



Figure 2.

Locations of Mammography Facilities by County, 2001

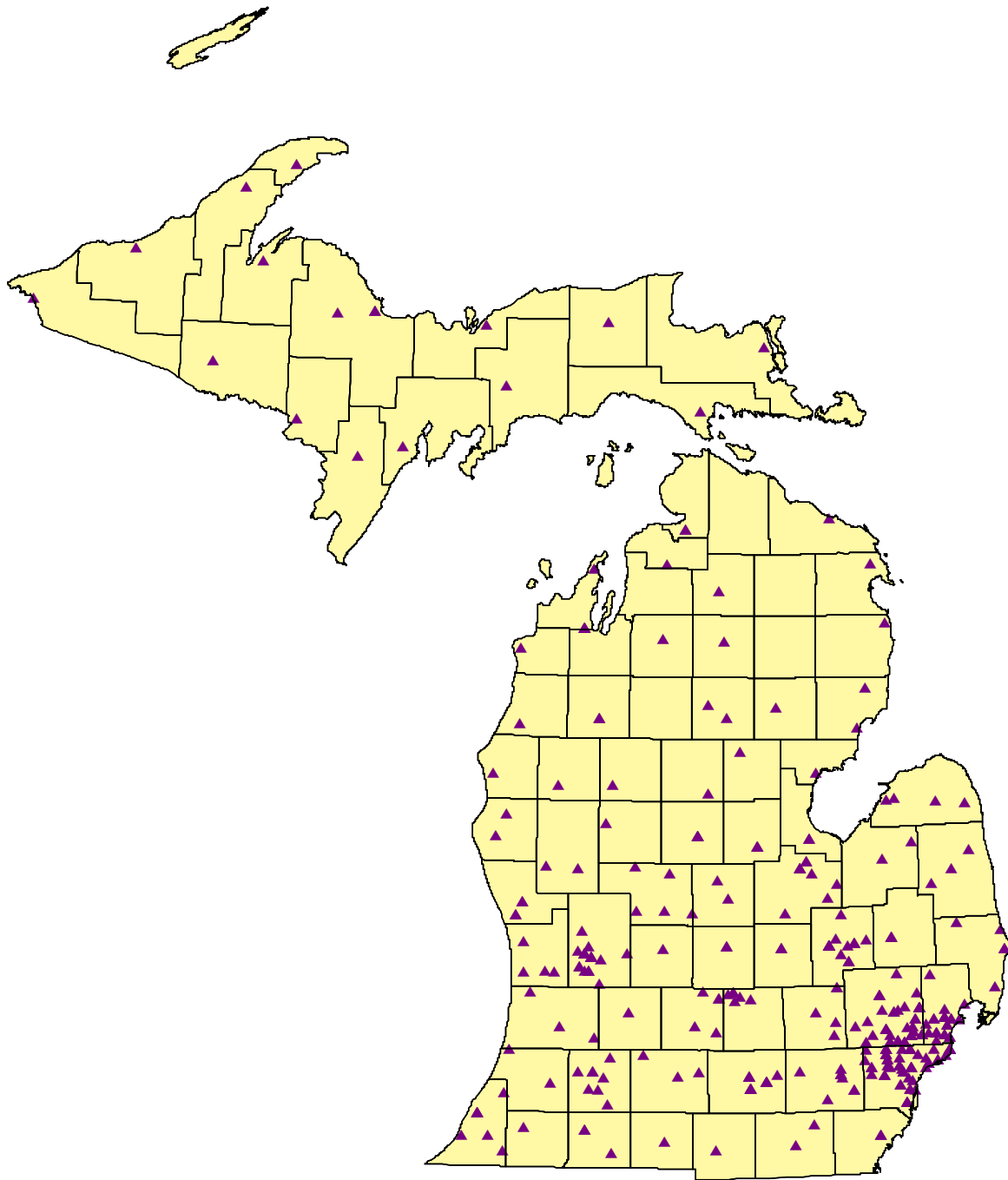


Figure 3.

Number of Radiation Therapy Facilities by County, 2001

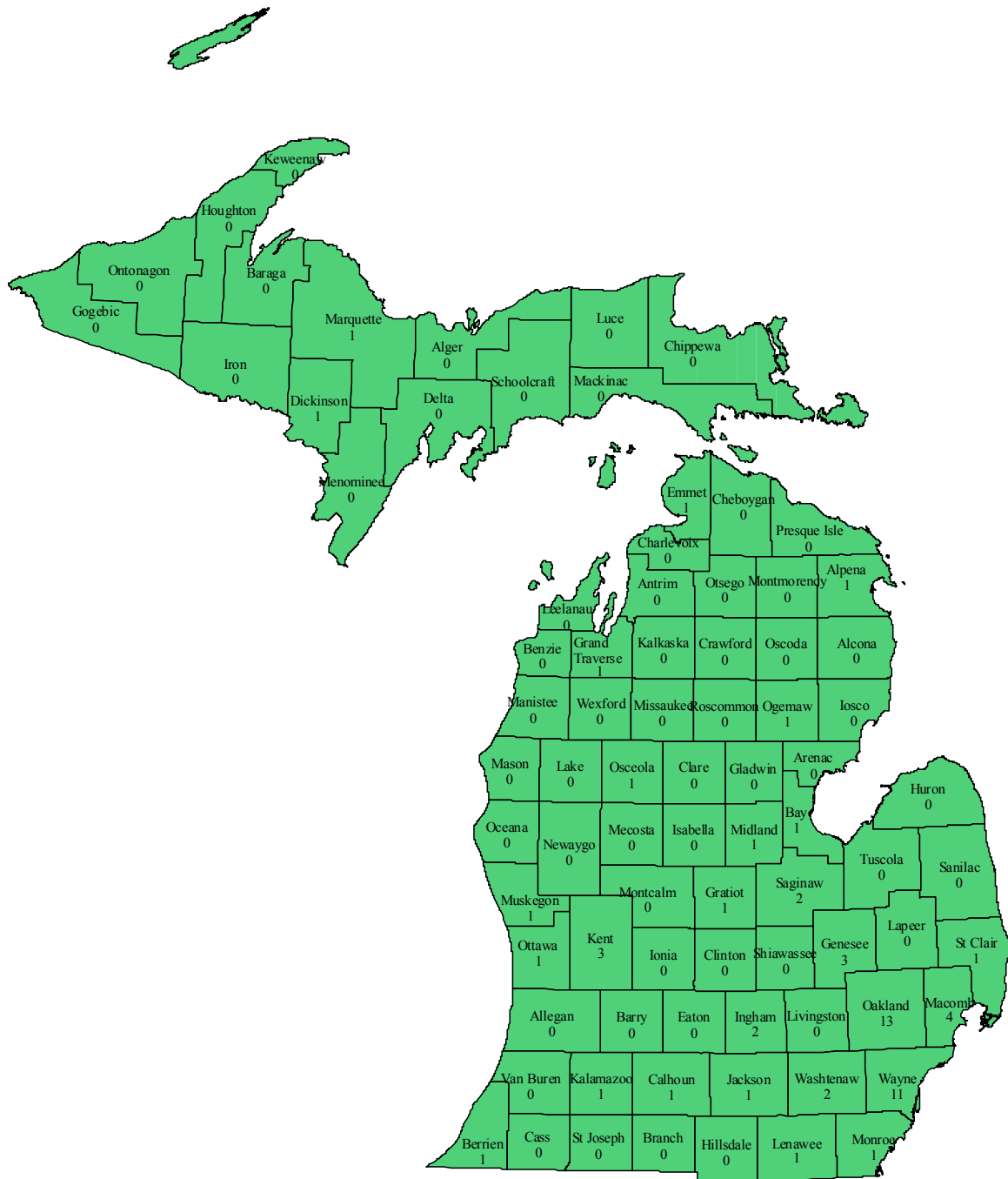


Figure 4.

Locations of Radiation Therapy Facilities by County, 2001

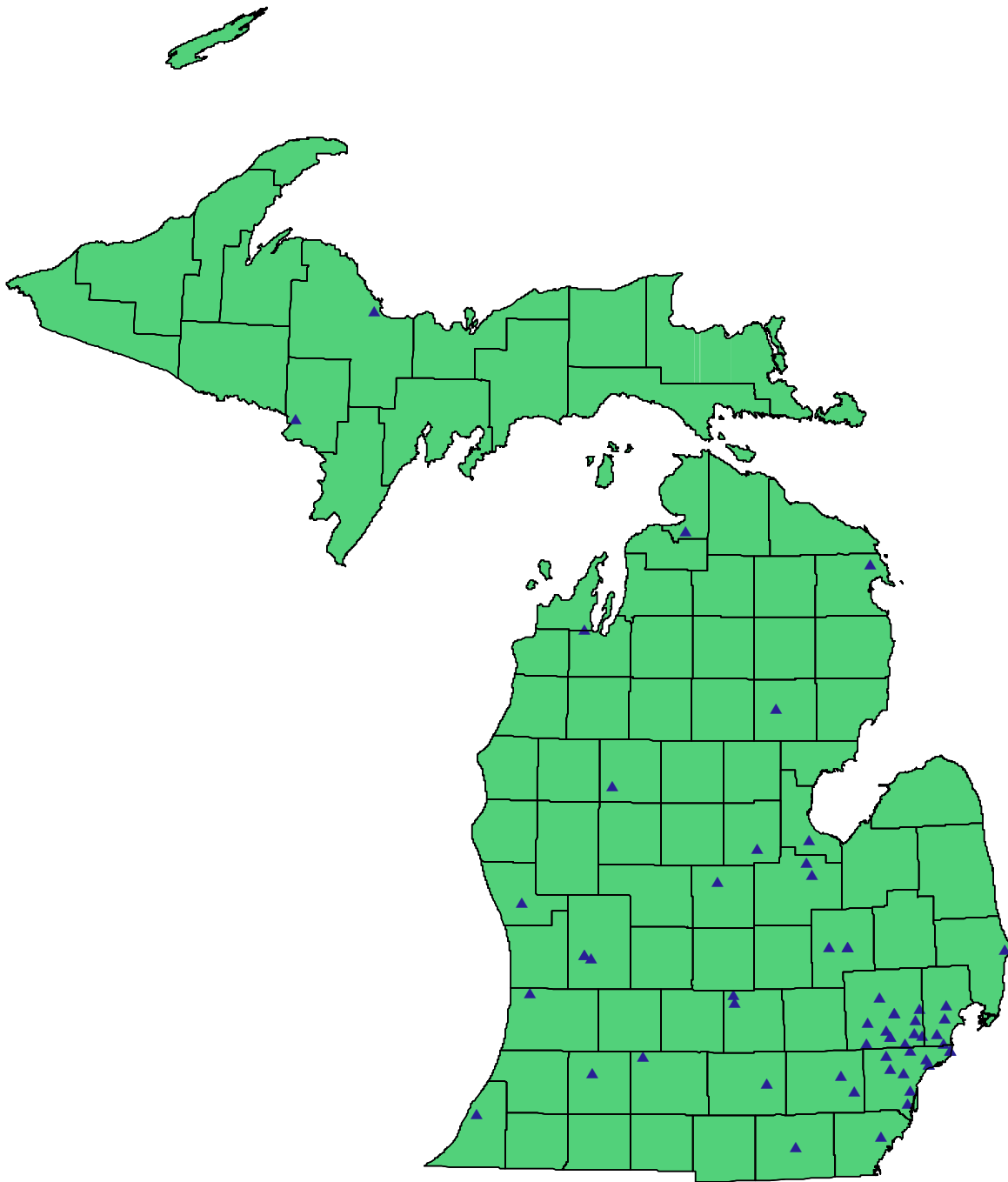


Figure 5.

Population of Women Age 40 and Over by County, 1999

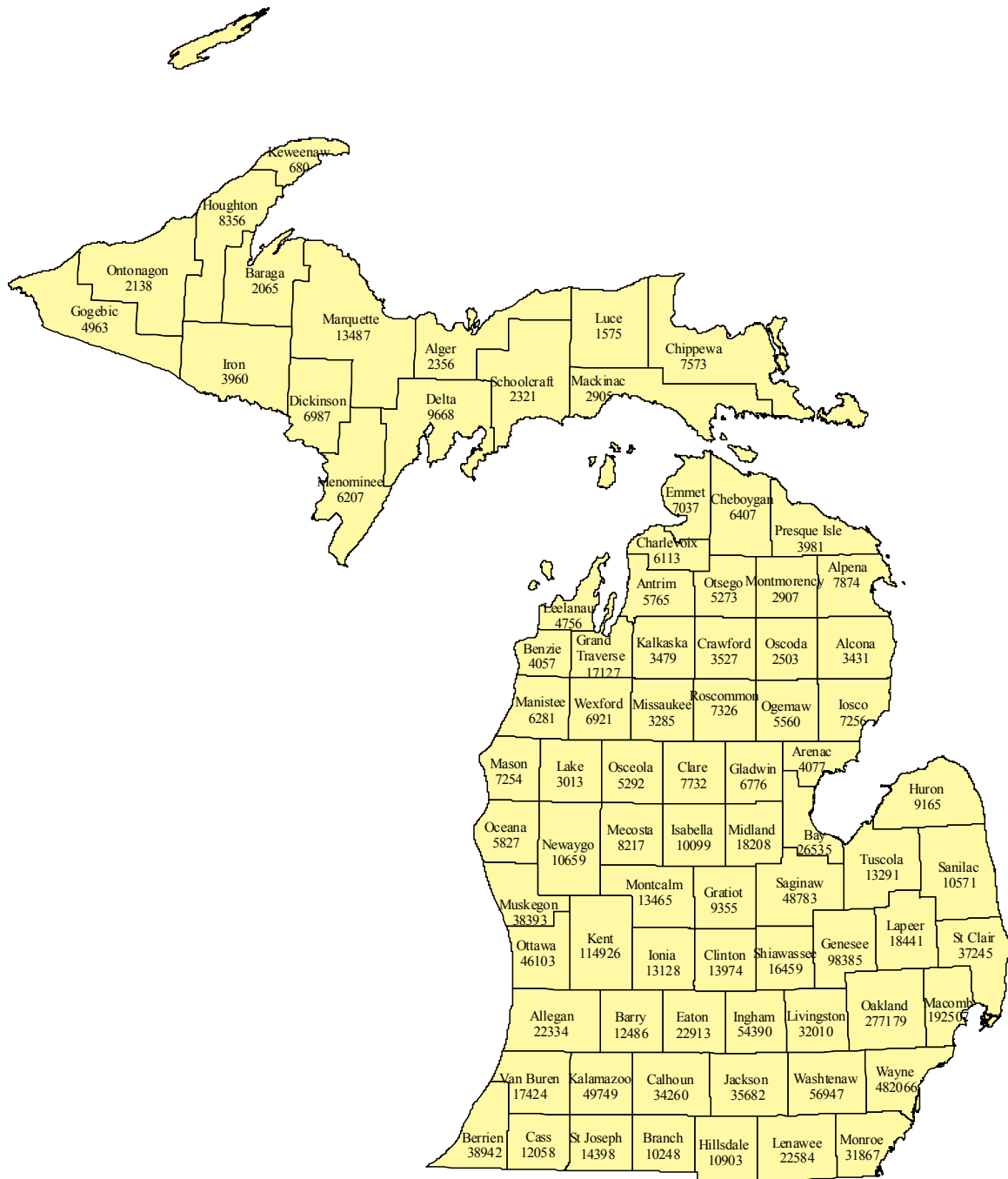
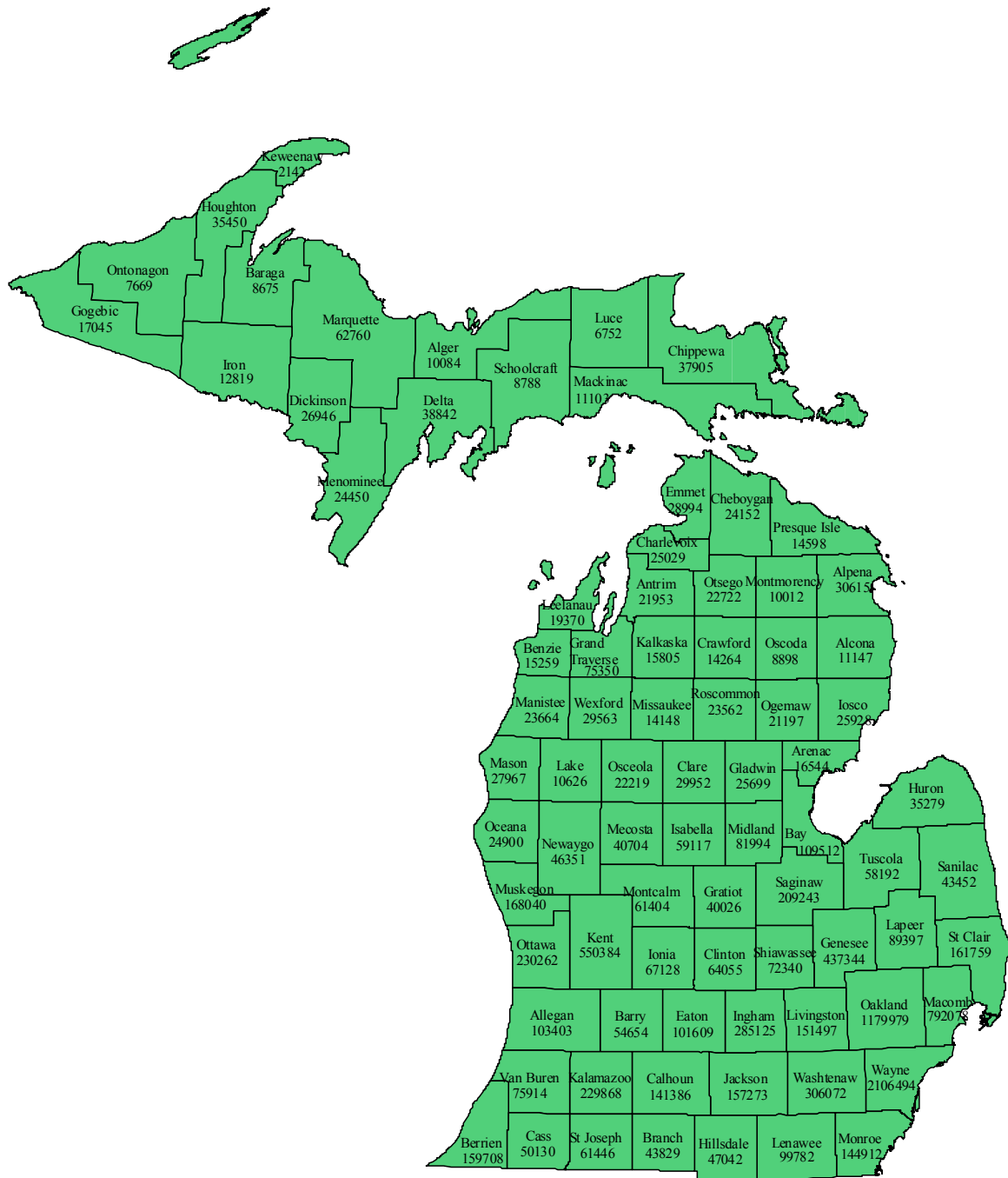


Figure 6.

Total Population by County, 1999



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Table 1.

Breast, Cervical, Colorectal, Lung and Prostate Cancer Mortality Rates by County, Michigan Residents 1991-2000

County	Age-Adjusted Rate per 100,000 Population*				
	Breast	Cervix	Colorectal	Lung	Prostate
Alcona	32.7	1.9	21.0	66.2	31.9
Alger	23.5	4.0	17.5	62.6	49.3
Allegan	28.5	1.5	22.0	52.3	37.8
Alpena	32.7	3.1	21.7	59.7	47.4
Antrim	35.9	2.4	21.3	60.7	52.3
Arenac	31.8	3.6	22.0	65.1	34.3
Baraga	17.2	2.5	18.8	64.7	35.3
Barry	33.5	1.5	19.0	50.5	35.6
Bay	26.4	2.3	20.3	63.2	35.6
Benzie	27.0	4.3	20.2	62.8	43.1
Berrien	30.0	5.3	23.2	63.5	35.5
Branch	28.3	3.2	19.9	63.8	26.7
Calhoun	29.7	2.8	23.9	60.9	36.6
Cass	32.0	4.2	25.5	67.3	38.6
Charlevoix	21.6	3.9	18.7	57.5	45.6
Cheboygan	31.8	6.1	21.2	69.5	37.6
Chippewa	22.1	3.7	24.9	57.8	27.7
Clare	24.2	1.9	25.0	82.4	30.3
Clinton	28.5	1.7	20.3	51.7	36.8
Crawford	30.1	1.1	26.4	79.8	38.4
Delta	34.3	3.3	21.8	61.2	32.9
Dickinson	26.6	3.4	19.1	49.6	23.6
Eaton	26.6	1.7	22.3	51.6	31.8
Emmet	21.3	2.8	18.9	57.6	23.3
Genesee	33.0	3.6	22.3	66.8	39.1
Gladwin	32.3	3.2	18.8	74.3	28.4
Gogebic	26.1	2.2	21.1	54.6	44.4
Grand Traverse	22.2	1.3	19.1	56.1	37.5
Gratiot	27.0	5.4	18.7	50.2	36.7
Hillsdale	24.1	1.8	26.0	56.9	31.2
Houghton	26.6	4.3	20.6	45.6	37.5
Huron	28.7	0.7	23.3	51.4	36.5
Ingham	29.8	2.2	20.8	52.8	35.9
Ionia	24.5	2.0	19.4	52.7	37.0
Iosco	28.1	2.2	24.9	73.5	45.7
Iron	32.9	0.6	17.7	64.6	25.6
Isabella	27.6	2.2	19.3	60.1	35.8
Jackson	32.5	4.2	23.9	64.2	38.0
Kalamazoo	28.5	2.7	21.3	55.3	39.9
Kalkaska	22.0	2.7	28.9	67.0	36.2
Kent	29.5	1.9	20.1	48.7	32.5

Keweenaw	21.5	0.0	3.7	48.4	7.3
Lake	36.4	6.6	30.1	72.8	61.0
Lapeer	28.9	2.4	24.5	61.2	44.4
Leelanau	36.7	2.6	15.6	55.0	29.3
Lenawee	29.3	3.9	21.7	57.7	31.7
Livingston	30.3	2.0	24.0	54.4	43.5
Luce	17.5	9.1	20.8	70.6	36.7
Mackinac	42.0	4.4	25.1	72.9	35.0
Macomb	32.0	2.3	23.3	61.2	38.2
Manistee	29.7	3.9	27.6	62.2	46.2
Marquette	28.1	2.1	19.3	56.1	27.9
Mason	27.9	2.5	20.2	54.8	32.4
Mecosta	28.3	3.0	25.6	62.0	34.9
Menominee	19.2	3.1	16.7	52.3	35.7
Midland	26.8	2.3	21.3	58.4	27.3
Missaukee	13.5	1.9	14.3	60.3	31.0
Monroe	29.5	4.5	24.3	64.3	34.7
Montcalm	21.2	3.2	24.1	66.5	34.8
Montmorency	30.8	4.3	29.8	65.2	41.5
Muskegon	31.5	2.4	19.2	58.3	30.2
Newaygo	21.1	0.5	19.7	59.1	25.6
Oakland	29.8	2.3	20.4	53.5	35.9
Oceana	23.0	2.5	23.7	56.2	30.3
Ogemaw	24.8	5.0	28.7	68.2	40.3
Ontonagon	23.1	4.6	18.7	55.7	61.6
Osceola	24.3	3.0	18.4	69.1	35.1
Oscoda	29.1	0.0	18.0	68.3	32.6
Otsego	28.9	3.2	21.4	49.1	38.4
Ottawa	27.2	1.1	19.8	37.4	33.7
Presque Isle	30.3	0.8	19.0	61.3	30.7
Roscommon	25.2	2.1	21.4	69.1	27.3
Saginaw	28.7	3.3	22.5	61.2	41.6
St. Clair	29.9	2.7	25.2	63.9	37.5
St. Joseph	26.7	2.6	26.1	64.7	35.6
Sanilac	28.7	6.9	23.9	58.5	37.3
Schoolcraft	26.7	3.4	25.3	71.3	29.9
Shiawassee	28.6	3.8	24.3	55.3	31.3
Tuscola	30.5	1.9	25.6	53.6	39.5
Van Buren	22.9	2.2	23.9	56.4	37.7
Washtenaw	30.3	2.7	21.4	55.0	38.5
Wayne	33.8	3.6	24.6	64.4	42.8
Wexford	30.4	2.8	20.6	61.8	30.8
Michigan	30.3	2.9	22.4	59.2	37.4

*Rates are computed by gender for breast, cervical and prostate cancer.

Table 2.

Breast, Cervical, Colorectal, Lung and Prostate Cancer Incidence Rates by County, Michigan Residents 1990-1999

County	Age-Adjusted Rate per 100,000 Population*				
	Breast	Cervical (in situ and invasive)	Colorectal	Lung	Prostate
Alcona	138.9	75.3	59.3	90.3	191.6
Alger	127.0	62.6	63.0	73.0	171.2
Allegan	123.3	46.5	55.2	60.9	131.1
Alpena	131.3	85.0	71.4	82.1	202.5
Antrim	127.1	44.2	51.9	76.4	223.4
Arenac	115.9	39.3	66.3	92.0	195.6
Baraga	115.6	47.1	54.9	77.1	149.0
Barry	96.7	34.7	42.7	52.3	146.0
Bay	120.3	52.3	56.6	80.8	192.1
Benzie	136.9	72.3	60.9	85.4	222.5
Berrien	141.7	43.6	61.0	83.5	202.8
Branch	112.1	31.0	49.0	72.2	162.5
Calhoun	131.8	43.0	58.0	78.7	175.8
Cass	104.8	34.9	49.5	69.5	135.0
Charlevoix	136.9	47.6	54.0	66.4	199.6
Cheboygan	127.9	43.0	54.9	72.7	233.7
Chippewa	120.7	29.1	61.8	72.3	152.1
Clare	104.8	56.8	65.7	104.7	185.0
Clinton	101.8	24.1	51.6	51.0	145.0
Crawford	134.2	60.3	52.0	79.7	158.4
Delta	154.5	38.0	60.9	77.9	160.6
Dickinson	125.2	41.3	57.9	61.9	132.5
Eaton	121.7	37.5	49.1	58.6	156.5
Emmet	138.2	49.2	55.9	72.5	164.9
Genesee	141.4	68.8	59.9	84.4	243.3
Gladwin	122.5	60.2	59.9	97.5	187.6
Gogebic	109.4	60.8	51.1	65.3	134.2
Grand Traverse	167.3	74.6	63.1	87.1	268.1
Gratiot	137.8	51.6	57.7	64.6	183.0
Hillsdale	110.1	26.4	57.1	65.4	144.6
Houghton	130.7	37.0	54.0	54.2	158.9
Huron	119.3	35.8	55.1	59.2	180.5
Ingham	140.8	42.5	62.5	72.9	189.0
Ionia	112.0	52.6	48.3	61.3	146.8
Iosco	129.6	43.5	69.8	93.8	208.9
Iron	114.3	34.2	54.1	78.5	100.2
Isabella	125.9	26.9	56.6	66.3	179.9
Jackson	110.9	44.1	58.0	81.9	154.2
Kalamazoo	132.0	62.0	52.3	68.5	207.2

Kalkaska	122.6	69.9	57.5	80.0	171.0
Kent	138.2	52.9	52.3	59.2	190.4
Keweenaw	115.2	8.4	50.1	48.4	139.3
Lake	123.3	69.9	67.1	83.5	184.9
Lapeer	117.9	77.4	59.9	77.4	203.3
Leelanau	118.6	49.8	48.6	56.4	209.0
Lenawee	117.6	41.7	54.3	68.5	149.8
Livingston	128.3	41.7	52.8	62.9	157.6
Luce	155.3	78.9	54.2	87.4	174.3
Mackinac	138.8	54.9	73.3	87.6	186.6
Macomb	134.6	80.0	64.0	83.2	215.3
Manistee	116.1	53.4	63.1	81.2	209.1
Marquette	155.1	56.0	55.8	76.2	183.8
Mason	127.7	57.7	62.3	67.3	201.3
Mecosta	126.6	47.4	56.2	76.9	151.3
Menominee	105.9	42.9	45.9	62.3	157.9
Midland	135.1	28.9	57.1	63.5	182.6
Missaukee	144.9	60.5	56.4	59.7	124.2
Monroe	91.8	48.6	50.1	76.8	124.6
Montcalm	121.4	59.2	66.4	78.4	182.4
Montmorency	140.2	73.7	66.4	105.0	211.7
Muskegon	137.2	51.0	54.1	70.6	208.0
Newaygo	123.9	50.5	60.6	72.6	192.0
Oakland	149.0	78.3	60.1	74.5	239.7
Oceana	132.3	48.4	51.7	70.7	186.1
Ogemaw	117.7	36.9	54.6	75.8	184.7
Ontonagon	123.8	69.3	61.8	65.5	165.6
Osceola	140.5	53.8	72.9	91.9	184.9
Oscoda	128.1	38.8	55.2	76.5	136.5
Otsego	146.8	54.1	56.8	66.4	262.2
Ottawa	131.7	33.8	54.8	44.8	180.6
Presque Isle	121.7	54.3	56.4	72.1	186.0
Roscommon	146.9	51.5	61.7	102.5	204.7
Saginaw	123.3	43.5	53.5	75.0	218.5
St. Clair	134.4	83.1	66.8	85.6	168.3
St. Joseph	112.8	55.8	58.3	74.9	155.2
Sanilac	105.5	77.4	59.1	67.8	159.7
Schoolcraft	126.2	65.9	58.6	87.0	191.5
Shiawassee	137.3	56.9	62.8	75.8	211.0
Tuscola	135.4	38.6	67.0	66.8	190.6
Van Buren	116.2	55.8	56.2	68.9	173.3
Washtenaw	146.1	36.0	54.7	66.3	194.8
Wayne	130.3	80.2	62.8	89.5	239.0
Wexford	140.3	47.9	65.5	81.9	190.5
Michigan	132.4	62.6	59.1	77.0	205.8

*Rates are computed by gender for breast, cervical and prostate cancer.

Table 3.

Percentage of Breast Cancer Cases Localized at Diagnosis by County, 1987-1989 and 1997-1999

County	Localized at Diagnosis	
	1987-1989	1997-1999
Alcona	47.8%	61.0%
Alger	39.3%	64.0%
Allegan	45.5%	57.7%
Alpena	42.7%	61.8%
Antrim	42.9%	41.2%
Arenac	50.0%	78.1%
Baraga	50.0%	31.3%
Barry	31.9%	66.7%
Bay	37.7%	61.2%
Benzie	30.0%	72.7%
Berrien	52.7%	63.5%
Branch	35.4%	63.0%
Calhoun	60.6%	67.1%
Cass	31.1%	48.1%
Charlevoix	32.5%	44.4%
Cheboygan	70.9%	62.1%
Chippewa	49.0%	53.7%
Clare	53.8%	42.9%
Clinton	58.3%	53.5%
Crawford	38.5%	61.5%
Delta	55.7%	79.3%
Dickinson	38.2%	36.1%
Eaton	46.4%	56.0%
Emmet	60.0%	70.8%
Genesee	55.1%	54.7%
Gladwin	72.7%	74.1%
Gogebic	40.7%	44.7%
Grand Traverse	38.6%	64.4%
Gratiot	73.1%	63.2%
Hillsdale	60.3%	63.9%
Houghton	65.9%	63.0%
Huron	25.7%	45.8%
Ingham	43.5%	61.4%
Ionia	35.9%	58.3%
Iosco	41.7%	65.3%
Iron	49.0%	45.0%
Isabella	62.7%	28.6%
Jackson	55.5%	72.2%
Kalamazoo	69.2%	66.5%

Kalkaska	56.5%	60.0%
Kent	48.8%	63.3%
Keweenaw	50.0%	0.0%
Lake	19.0%	56.7%
Lapeer	47.6%	54.8%
Leelanau	31.6%	71.1%
Lenawee	38.1%	59.1%
Livingston	30.3%	55.4%
Luce	27.3%	62.5%
Mackinac	78.1%	46.2%
Macomb	53.3%	63.7%
Manistee	53.3%	59.0%
Marquette	46.2%	63.7%
Mason	14.7%	70.1%
Mecosta	22.4%	61.7%
Menominee	45.6%	56.6%
Midland	65.1%	72.4%
Missaukee	34.8%	57.5%
Monroe	34.1%	62.7%
Montcalm	44.7%	50.0%
Montmorency	37.5%	73.9%
Muskegon	48.2%	62.6%
Newaygo	40.0%	76.1%
Oakland	56.8%	64.0%
Oceana	43.2%	58.3%
Ogemaw	50.0%	57.4%
Ontonagon	38.1%	66.7%
Osceola	20.5%	65.2%
Oscoda	35.7%	65.5%
Otsego	33.3%	44.7%
Ottawa	51.3%	53.7%
Presque Isle	46.8%	61.4%
Roscommon	30.5%	61.3%
Saginaw	45.4%	66.4%
St. Clair	41.6%	63.1%
St. Joseph	38.5%	54.6%
Sanilac	29.5%	59.1%
Schoolcraft	37.5%	63.2%
Shiawassee	31.0%	69.8%
Tuscola	46.2%	57.0%
Van Buren	40.2%	67.9%
Washtenaw	37.8%	66.5%
Wayne	50.4%	57.7%
Wexford	19.1%	52.2%
Michigan	49.6%	61.0%

Table 4.

Percentage of Breast Cancer Cases In-situ at Diagnosis by County, 1987-1989 and 1997-1999

County	In-situ at Diagnosis	
	1987-1989	1997-1999
Alcona	14.8%	12.8%
Alger	6.7%	10.7%
Allegan	8.3%	16.1%
Alpena	8.9%	16.5%
Antrim	4.5%	22.7%
Arenac	3.2%	15.8%
Baraga	11.1%	5.9%
Barry	10.4%	17.9%
Bay	9.7%	11.8%
Benzie	3.2%	31.3%
Berrien	7.4%	15.9%
Branch	9.2%	11.0%
Calhoun	7.4%	18.0%
Cass	7.5%	13.5%
Charlevoix	9.1%	26.0%
Cheboygan	0.0%	6.5%
Chippewa	3.8%	10.7%
Clare	24.6%	15.2%
Clinton	10.0%	20.5%
Crawford	0.0%	13.3%
Delta	3.2%	12.1%
Dickinson	5.6%	10.3%
Eaton	12.2%	19.8%
Emmet	3.5%	19.1%
Genesee	7.2%	17.3%
Gladwin	10.8%	16.9%
Gogebic	10.6%	9.5%
Grand Traverse	6.5%	18.5%
Gratiot	1.5%	14.4%
Hillsdale	16.1%	20.9%
Houghton	3.5%	10.0%
Huron	3.9%	14.3%
Ingham	11.5%	17.8%
Ionia	6.1%	17.6%
Iosco	7.7%	12.8%
Iron	8.9%	13.0%
Isabella	5.6%	20.0%
Jackson	7.9%	21.5%
Kalamazoo	13.8%	15.8%

Kalkaska	4.2%	18.9%
Kent	10.8%	16.8%
Keweenaw	14.3%	0.0%
Lake	12.5%	18.9%
Lapeer	5.4%	17.2%
Leelanau	5.0%	15.6%
Lenawee	8.7%	13.7%
Livingston	11.3%	19.0%
Luce	0.0%	11.1%
Mackinac	0.0%	7.1%
Macomb	8.8%	20.3%
Manistee	10.0%	17.6%
Marquette	8.8%	11.8%
Mason	12.8%	17.2%
Mecosta	15.2%	21.4%
Menominee	3.4%	8.6%
Midland	13.6%	21.6%
Missaukee	0.0%	11.1%
Monroe	6.8%	13.0%
Montcalm	9.6%	19.3%
Montmorency	8.6%	20.7%
Muskegon	8.5%	13.0%
Newaygo	5.0%	6.1%
Oakland	12.7%	21.2%
Oceana	5.1%	11.8%
Ogemaw	2.2%	17.5%
Ontonagon	8.7%	4.5%
Osceola	15.2%	24.6%
Oscoda	0.0%	6.5%
Otsego	11.4%	17.4%
Ottawa	11.0%	14.8%
Presque Isle	6.0%	10.2%
Roscommon	6.3%	17.5%
Saginaw	4.6%	13.2%
St. Clair	10.9%	18.8%
St. Joseph	5.4%	11.2%
Sanilac	10.3%	23.5%
Schoolcraft	4.0%	9.5%
Shiawassee	7.4%	16.3%
Tuscola	5.5%	14.8%
Van Buren	12.8%	11.6%
Washtenaw	14.2%	24.5%
Wayne	9.8%	22.2%
Wexford	4.1%	19.8%
Michigan	9.7%	18.8%

Table 5.

Percentage of Cervical Cancer Cases In-situ at Diagnosis by County, 1987-1989 and 1997-1999

County	In-situ at Diagnosis	
	1987-1989	1997-1999
Alcona	50.0%	85.7%
Alger	66.7%	25.0%
Allegan	79.8%	70.2%
Alpena	69.2%	93.6%
Antrim	55.6%	91.7%
Arenac	36.4%	55.6%
Baraga	62.5%	50.0%
Barry	81.4%	74.1%
Bay	59.3%	80.2%
Benzie	83.3%	86.7%
Berrien	65.5%	76.1%
Branch	69.0%	15.4%
Calhoun	79.2%	57.7%
Cass	58.3%	63.2%
Charlevoix	53.8%	66.7%
Cheboygan	70.0%	69.2%
Chippewa	86.1%	66.7%
Clare	75.0%	72.7%
Clinton	100.0%	81.5%
Crawford	83.3%	92.9%
Delta	50.0%	64.3%
Dickinson	25.0%	92.9%
Eaton	75.6%	77.2%
Emmet	54.5%	69.6%
Genesee	76.3%	88.0%
Gladwin	61.1%	70.6%
Gogebic	75.0%	100.0%
Grand Traverse	78.8%	88.4%
Gratiot	70.8%	71.4%
Hillsdale	68.2%	75.0%
Houghton	38.9%	83.3%
Huron	65.0%	84.6%
Ingham	73.4%	87.2%
Ionia	82.4%	77.6%
Iosco	60.0%	37.5%
Iron	55.6%	60.0%
Isabella	77.8%	60.0%
Jackson	80.0%	82.6%
Kalamazoo	73.2%	84.6%

Kalkaska	75.0%	83.3%
Kent	84.9%	85.6%
Keweenaw	No cases reported	0.0%
Lake	80.0%	83.3%
Lapeer	81.0%	90.0%
Leelanau	72.7%	81.0%
Lenawee	76.7%	65.9%
Livingston	71.7%	83.6%
Luce	53.8%	66.7%
Mackinac	63.6%	77.8%
Macomb	84.5%	90.3%
Manistee	58.8%	83.3%
Marquette	86.6%	64.3%
Mason	52.2%	71.4%
Mecosta	61.5%	50.0%
Menominee	75.0%	87.5%
Midland	82.4%	47.1%
Missaukee	50.0%	71.4%
Monroe	83.3%	75.5%
Montcalm	71.2%	69.0%
Montmorency	75.0%	87.5%
Muskegon	74.0%	79.2%
Newaygo	94.6%	62.5%
Oakland	83.0%	89.9%
Oceana	52.4%	54.5%
Ogemaw	100.0%	37.5%
Ontonagon	33.3%	88.9%
Osceola	92.3%	78.6%
Oscoda	25.0%	100.0%
Otsego	58.3%	72.2%
Ottawa	77.8%	76.4%
Presque Isle	50.0%	88.9%
Roscommon	69.2%	81.3%
Saginaw	57.0%	80.2%
St. Clair	71.8%	89.8%
St. Joseph	77.5%	72.2%
Sanilac	70.0%	83.0%
Schoolcraft	100.0%	100.0%
Shiawassee	73.7%	78.9%
Tuscola	65.7%	82.9%
Van Buren	79.6%	77.6%
Washtenaw	67.3%	89.0%
Wayne	76.9%	86.4%
Wexford	53.3%	80.0%
Michigan	77.2%	85.3%

Table 6.

Percentage of Colorectal Cancer Cases
Localized at Diagnosis by County,
1987-1989 and 1997-1999

County	Localized at Diagnosis	
	1987-1989	1997-1999
Alcona	29.4%	25.8%
Alger	29.2%	33.3%
Allegan	34.6%	25.1%
Alpena	39.5%	29.3%
Antrim	14.9%	35.6%
Arenac	36.6%	48.5%
Baraga	30.0%	42.9%
Barry	18.8%	40.0%
Bay	28.9%	40.1%
Benzie	19.2%	35.9%
Berrien	33.2%	29.7%
Branch	26.3%	32.8%
Calhoun	24.8%	34.1%
Cass	24.6%	29.7%
Charlevoix	13.2%	25.7%
Cheboygan	40.0%	45.8%
Chippewa	42.1%	25.9%
Clare	35.8%	32.9%
Clinton	38.0%	37.5%
Crawford	20.8%	38.1%
Delta	42.7%	60.5%
Dickinson	44.9%	17.5%
Eaton	27.9%	28.0%
Emmet	44.6%	36.8%
Genesee	32.7%	37.2%
Gladwin	25.0%	31.7%
Gogebic	27.7%	26.3%
Grand Traverse	34.3%	33.3%
Gratiot	47.9%	41.3%
Hillsdale	23.9%	29.3%
Houghton	44.7%	34.8%
Huron	18.2%	18.8%
Ingham	32.5%	39.0%
Ionia	20.3%	40.0%
Iosco	71.8%	25.4%
Iron	29.3%	18.9%
Isabella	60.4%	23.0%
Jackson	45.1%	56.7%
Kalamazoo	40.4%	25.5%

Kalkaska	45.0%	42.1%
Kent	23.6%	27.0%
Keweenaw	0.0%	50.0%
Lake	22.7%	32.3%
Lapeer	25.7%	41.0%
Leelanau	33.3%	32.3%
Lenawee	28.1%	39.7%
Livingston	16.4%	29.8%
Luce	36.4%	40.0%
Mackinac	35.3%	31.8%
Macomb	38.0%	37.9%
Manistee	40.0%	42.6%
Marquette	43.7%	41.9%
Mason	9.5%	38.8%
Mecosta	20.0%	28.8%
Menominee	32.7%	47.5%
Midland	40.4%	30.5%
Missaukee	25.0%	36.7%
Monroe	15.9%	24.5%
Montcalm	21.0%	22.7%
Montmorency	40.0%	8.0%
Muskegon	45.8%	34.6%
Newaygo	26.5%	47.1%
Oakland	34.4%	38.3%
Oceana	16.1%	25.6%
Ogemaw	36.5%	38.0%
Ontonagon	17.6%	24.0%
Osceola	22.6%	31.6%
Oscoda	6.3%	38.1%
Otsego	23.1%	20.5%
Ottawa	35.0%	29.1%
Presque Isle	30.6%	35.9%
Roscommon	21.0%	40.0%
Saginaw	41.2%	53.1%
St. Clair	26.5%	34.8%
St. Joseph	21.1%	28.0%
Sanilac	22.4%	31.2%
Schoolcraft	33.3%	35.0%
Shiawassee	14.4%	42.1%
Tuscola	36.7%	35.3%
Van Buren	27.6%	27.4%
Washtenaw	18.6%	37.7%
Wayne	29.7%	36.9%
Wexford	6.3%	31.7%
Michigan	31.6%	35.7%

Table 7.

Percentage of Lung Cancer Cases Localized at Diagnosis by County, 1987-1989 and 1997-1999

County	Localized at Diagnosis	
	1987-1989	1997-1999
Alcona	12.9%	18.6%
Alger	11.1%	22.7%
Allegan	18.8%	17.1%
Alpena	19.2%	23.7%
Antrim	22.5%	16.9%
Arenac	25.0%	15.6%
Baraga	14.3%	0.0%
Barry	13.5%	30.7%
Bay	15.7%	21.6%
Benzie	10.0%	15.0%
Berrien	19.5%	23.9%
Branch	10.8%	20.8%
Calhoun	47.6%	20.3%
Cass	16.7%	16.8%
Charlevoix	17.4%	11.1%
Cheboygan	15.1%	10.6%
Chippewa	17.1%	14.5%
Clare	16.5%	22.6%
Clinton	20.0%	20.8%
Crawford	8.8%	21.6%
Delta	15.9%	28.3%
Dickinson	14.7%	25.0%
Eaton	11.9%	17.3%
Emmet	20.8%	23.4%
Genesee	22.1%	21.3%
Gladwin	25.0%	12.2%
Gogebic	5.7%	22.2%
Grand Traverse	11.4%	22.0%
Gratiot	36.8%	29.3%
Hillsdale	25.4%	22.5%
Houghton	19.6%	13.9%
Huron	29.4%	16.1%
Ingham	18.5%	16.7%
Ionia	15.4%	24.5%
Iosco	26.3%	18.7%
Iron	10.3%	22.8%
Isabella	13.0%	20.9%
Jackson	32.9%	38.2%
Kalamazoo	21.7%	18.1%

Kalkaska	10.3%	7.5%
Kent	16.1%	17.3%
Keweenaw	0.0%	0.0%
Lake	18.2%	13.8%
Lapeer	13.0%	23.6%
Leelanau	12.1%	19.4%
Lenawee	10.3%	24.5%
Livingston	9.2%	15.8%
Luce	10.5%	11.1%
Mackinac	16.7%	22.5%
Macomb	23.0%	19.9%
Manistee	7.0%	19.1%
Marquette	19.2%	13.9%
Mason	33.3%	23.1%
Mecosta	11.8%	21.3%
Menominee	12.5%	20.8%
Midland	25.8%	19.0%
Missaukee	25.9%	9.4%
Monroe	10.7%	11.2%
Montcalm	15.4%	22.5%
Montmorency	10.9%	18.8%
Muskegon	36.8%	26.2%
Newaygo	18.2%	14.1%
Oakland	21.7%	20.6%
Oceana	37.2%	15.3%
Ogemaw	20.4%	33.3%
Ontonagon	14.3%	22.2%
Osceola	15.2%	27.8%
Oscoda	5.0%	40.7%
Otsego	16.3%	13.5%
Ottawa	18.0%	14.3%
Presque Isle	8.3%	25.7%
Roscommon	17.2%	23.8%
Saginaw	27.5%	28.4%
St. Clair	13.7%	14.1%
St. Joseph	18.4%	19.9%
Sanilac	16.7%	14.3%
Schoolcraft	0.0%	31.0%
Shiawassee	10.8%	30.9%
Tuscola	20.0%	24.0%
Van Buren	11.7%	14.2%
Washtenaw	8.7%	17.1%
Wayne	18.8%	18.1%
Wexford	7.8%	19.4%
Michigan	19.9%	19.8%

Table 8.

Percentage of Prostate Cancer Cases Localized at Diagnosis by County, 1987-1989 and 1997-1999

County	Localized at Diagnosis	
	1987-1989	1997-1999
Alcona	64.7%	76.7%
Alger	28.6%	56.0%
Allegan	40.8%	64.2%
Alpena	57.7%	65.8%
Antrim	42.1%	69.6%
Arenac	58.7%	75.0%
Baraga	26.7%	53.8%
Barry	45.5%	76.9%
Bay	61.1%	85.7%
Benzie	26.3%	73.0%
Berrien	51.7%	66.9%
Branch	38.9%	62.0%
Calhoun	63.1%	75.1%
Cass	37.5%	55.7%
Charlevoix	23.8%	82.0%
Cheboygan	60.4%	73.7%
Chippewa	44.4%	76.2%
Clare	61.8%	60.4%
Clinton	46.9%	66.4%
Crawford	40.0%	62.5%
Delta	67.9%	79.6%
Dickinson	35.9%	23.9%
Eaton	44.1%	64.7%
Emmet	62.5%	81.3%
Genesee	51.6%	53.2%
Gladwin	57.1%	75.8%
Gogebic	80.6%	67.6%
Grand Traverse	38.1%	66.6%
Gratiot	48.1%	55.4%
Hillsdale	54.3%	76.4%
Houghton	75.7%	53.5%
Huron	28.9%	63.4%
Ingham	44.2%	60.6%
Ionia	39.7%	61.4%
Iosco	44.4%	75.9%
Iron	28.6%	52.9%
Isabella	87.0%	44.1%
Jackson	64.3%	63.9%
Kalamazoo	48.4%	62.9%

Kalkaska	36.4%	76.6%
Kent	47.4%	68.2%
Keweenaw	33.3%	28.6%
Lake	21.7%	70.0%
Lapeer	64.4%	67.7%
Leelanau	30.8%	82.7%
Lenawee	43.4%	78.6%
Livingston	40.6%	77.2%
Luce	66.7%	71.4%
Mackinac	44.4%	81.3%
Macomb	64.7%	74.9%
Manistee	43.6%	70.7%
Marquette	51.5%	58.7%
Mason	40.5%	77.5%
Mecosta	48.9%	58.1%
Menominee	36.4%	71.4%
Midland	58.6%	69.2%
Missaukee	16.7%	60.6%
Monroe	34.2%	78.3%
Montcalm	45.9%	60.0%
Montmorency	58.1%	47.6%
Muskegon	61.1%	79.0%
Newaygo	38.3%	72.2%
Oakland	61.6%	76.7%
Oceana	48.1%	84.2%
Ogemaw	40.9%	66.7%
Ontonagon	47.4%	54.2%
Osceola	25.0%	74.1%
Oscoda	22.2%	64.3%
Otsego	44.4%	46.7%
Ottawa	68.9%	59.8%
Presque Isle	53.1%	84.0%
Roscommon	44.4%	62.0%
Saginaw	44.9%	85.3%
St. Clair	48.2%	54.4%
St. Joseph	37.7%	59.8%
Sanilac	38.5%	50.9%
Schoolcraft	35.3%	73.9%
Shiawassee	34.8%	75.5%
Tuscola	50.0%	71.5%
Van Buren	36.8%	63.3%
Washtenaw	37.7%	77.0%
Wayne	59.5%	75.5%
Wexford	25.9%	63.2%
Michigan	54.3%	71.0%